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THE
JOURNAL OF CONCHOLOGY:

BEING THE ORGAN OF THE
CONCHOLOGICAL SOCIETY
OF GREAT BRITAIN AND IRELAND.

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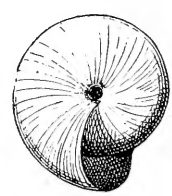
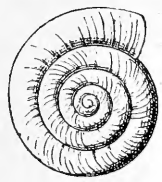
BY

WILLIAM E. HOYLE.

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ERRATA.

Page 62, line 12, for "Steenii" read "Steeni."

Page 63, line 3, insert "×" in column 2.

Page 201, line 21, for "glaucopsis" read "glaucopis."

Page 234, line 10, delete "18" in line with "L. cinereo-niger."

Page 255, headline for "INDIAN" read "AMERICAN."

Page 279, line 15 from bottom

for "Winston, Dorset" read "Winston, Durham."

for "Molton, Dorset," read "Molton, Devon."

line 9 from bottom for "behni" read "rüsei."

Page 294, line 2 from bottom for "vol. 2" read "vol. 1."

Page 335, line 3 from bottom for "Belfast" read "Larne."

*Page 354 after "secale Draparnaud 70" insert "*quinqüedentata (Born) [=cinerea Drap.] 70A."*

Constitution & List of Members

OF THE

CONCHOLOGICAL SOCIETY

OF

GREAT BRITAIN AND IRELAND.

- 1.—This Society shall be called “**The Conchological Society of Great Britain and Ireland.**”
- 2.—Its object shall be the promotion of the science of Conchology, by the holding of Meetings for the reading and discussion of original papers, by the publication of proceedings, and by the formation of a Library and Collections illustrative of the science.
- 3.—It shall consist of Ordinary and Honorary Members.
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 1886. Coates, Henry, F.R.S.E., Pitcullen House, Perth.
 1901. Cockshott, W. A., 13, Tithebarn Street, Liverpool.

1880. Collier, Edwd., Carlton House, Whalley Range, Manchester.
 1895. Collier, Frank, Carlton House, Whalley Range, Manchester.
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 1894. Evans, Wm., F.R.S.E., 18A, Morningside Park, Edinburgh.
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 1886. Fitzgerald, Mrs. J., Kapai, Maidstone Road, Headcorn, Kent.
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 1889. Gaskell, Roger, M.A., 5, The Grove, Highgate, London, N.
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 1886. L Godlee, Theo., Whips Cross, Walthamstow, Essex.
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 1886. Gwatkin, Rev. Prof. H. M., M.A., LL.D., Brantham Rectory, Manningtree.

1897. Hall, Thos. Bird, Larch Wood, Rock Ferry.
 1895. Hann, Rev. Adam, 14, The Crescent, Gateshead.
 1895. Hardy, John Ray, The Museum, Owens College, Manchester.
 1895. Hardy, John, 11, Stockton Road, Chorlton-cum-Hardy, near Manchester.
 1887. Hargreaves, J. A., 3, Ramshill Road, Scarborough, Yorkshire.
 1897. Harrison, Miss G. M., 14, Queen's Road, Southport.
 1889. Hartley, Alfred, 19, Thorpe Garth, Idle, near Bradford, Yorkshire.
 1887. Harvard, T. Mawson, 23, Northbrook Road, Lee, London, S.E.
 1891. Hawell, Rev. John, M.A., Vicarage, Ingleby Greenhow, Middlesborough.
 1887. Heathcote, Wm. Henry, F.L.S., 47, Frenchwood Street, Preston.
 1888. Heitland, Mrs. M., The Priory, Shrewsbury.
 1896. Herdman, Prof. W. A., D.Sc., F.R.S., University College, Liverpool.
 1887. Hey, Thomas, 8, Bloomfield Street, Derby.
 1895. Hibbert, Charles R. C., Riccard's Down, Abbotsham, Bideford.
 1895. Hickson, Prof. Sydney J., D.Sc., M.A., F.R.S., The Owens College, Manchester.
 1893. Hill, John, Little Eaton, near Derby.
 1886. Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.
 1891. Horsley, Rev. J. W., St. Peter's Rectory, Walworth, London, S.E.
 1884. Howell, George O., 210, Eglinton Road, Plumstead, Kent.
 1892. Howorth, Sir Henry Hoyle, K.C.I.E., M.P., F.R.S., etc., 30, Collingham Gardens, London, S.W.
 1886. Hoyle, W. E., M.A., M.Sc., M.R.C.S., F.R.S.E., Director of the Manchester Museum, Owens College, Manchester.
 1895. Hudson, Rev. Hy. A., 1, Johnson Street, Cheetham, Manchester.
 1886. James, John H., A.R.I.Cornwall, 3, Truro Veau Terrace, Truro.
 1891. Jenner, James Herbert Augustus, F.E.S., 209, School Hill, Lewes.
 1901. Johnson, W. H., 97, Rumford Street, Chorlton-on-Medlock, Manchester.
 1894. Jones, Kenneth Iurlstone, M.B., R.N., H.M.S. "Waterwitch," China Station, Shanghai.
 1888. Jones, Wm. Jas., jun., 76, Mayes Road, Woodgreen, London, N.
 1889. Jordan, H. K., F.G.S., The Knoll, Clytha Park, Newport, Monmouthshire.
 1897. Kendig, Rev. Amos B., D.D., 86, Vernon Str., Brookline, Mass., U.S.A.
 1897. Kennard, A. S., Berrenden, Mackenzie Road, Beckenham, Kent.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne, Victoria.
 1887. Kew, H. Wallis, F.Z.S., 157, Ferme Park Road, Hornsey, N.
 1900. Killingbeck, J. H., Garth, near Llangollen.
 1889. Knight, Rev. G. A. Frank, M.A., Free Church Manse, Auchterarder, Perthshire.
 1901. Laidlaw, F. F., B.A., Owens College, Manchester.
 1899. Lancaster, Ernest Le Cronier, B.A., M.B., B.Ch. (Oxon.), Winchester House, Swansea.
 1879. Laver, Henry, M.R.C.S., F.L.S., Head Street, Colchester, Essex.
 1894. Lawson, Peter, 11, The Broadway, Walham Green, London, S.W.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne.
 1878. Leicester, Alfred, The Mount, Aston Clinton, Bucks.
 1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1896. Linton, John, 25, Wordsworth Road, Smallheath, Birmingham.
 1897. Lodder, Miss Mary, Lonah, Ulverstone, Tasmania.

1895. Loydell, A., 36, Milton Road, Acton, London, W.
 1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich.
 1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire.
1889. MacAndrew, James J., Lukesland, Ivy Bridge, Devonshire.
 1885. McKean, Kenneth, F.L.S., Lloyds, London, E.C.
 1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
 1884. Madison, James, 167, Bradford Street, Birmingham.
 1899. Mansel-Pleydell, J. C., B.A., F.L.S., F.G.S., D.T., Whatcombe, Dorset.
 1885. Marquand, Ernest D., Belle Vue, Alderney.
 1887. Marshall, J. T., Sevenoaks, Torquay, Devonshire.
 1887. Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
 1899. Mason, G. Edward, 11B, Stanford Place, Stanley Bridge, Fulham, S.W.
 1888. Mason, Philip Brooke, J.P., M.R.C.S., F.L.S., F.Z.S., Trent House, Burton-on-Trent.
1897. May, William Lewis, F.R.S. Tasm., Forest Hill, Sandford, Tasmania.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1880. Melvill, James Cosmo, M.A., F.L.S., Brook House, Prestwich, Manchester
 1891. Middleton, Robert, Gledhow, near Leeds.
 1888. Milne, J. Grafton, Holly House, Plaistow, London, E.
 1879. Milnes, Rev. Herbert, M.A., Berkeley Villa, Berkeley St., Cheltenham.
 1891. Mitchell, James, 240, Darnley Street, Pollokshields, Glasgow.
 1900. Moorcock, J., 119, Arngask Road, Catford, London, S.E.
 1891. Morris, Cecil Herbert, Lewes, Sussex.
 1899. Morris, G. M., 18, Northen Grove, W. Didsbury, Manchester.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
1899. Neild, J. E., Gilda Brook Road, Eccles.
 1887. Newstead, A. H. L., B.A., Rose Villa, Prospect Road, Snakes Lane, Woodford Green, Essex.
 1891. Newton, Richard Bullen, F.G.S., 7, Melrose Gardens, West Kensington Park, London, W.
 1891. Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., F.L.S., etc., The Red House, Berkhamstead.
1887. Oldham, Charles, Alderley Edge, Cheshire.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, Ingleside, Clifton Road, Sutton Coldfield, Warwickshire.
1900. Pannell, Chas., jr., East Street, Haslemere.
 1882. Parke, George H., F.L.S., F.G.S., St. John's, Wakefield.
 1887. Parry, Lieut.-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
 1898. Partridge, F. J., 75, High Street, Barnstaple, N. Devon.
 1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
1901. Penrose, G., Curator of Royal Institution of Cornwall, Truro.
 1896. Percival, A. Blayney, Somerset Court, Brent Knoll, Somerset.
 1896. Phillips, Robert Albert, Ashburton, Cork.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1898. Poore, Arthur S., 47, Griffin Road, Plumstead, Kent.
 1895. Powell, Mrs. A., Nant-y-Velin, Criccieth, N. Wales.
 1897. Preston, Hugh Berthon, 3, Sydney Terrace, Fulham Road, London, S.W.

1896. Ragdale, John Rowland, The Beeches, Whitefield, near Manchester.
1899. Ramanan, Vedaraniam Venkata, B.A., 20, Sami Pillay Street, Triplicane, Madras.
1900. Reeve, Miss J., South Road, Saffron Walden, Essex.
1896. Rhodes, John, F.E.S., 360, Blackburn Road, Accrington.
1900. Richards, C. P., Mission House, Stenalees, St. Austell, Cornwall.
1898. Roberts, A. William Rymer. Annesdale, Windermere.
- O Roebuck, Wm. Denison, F.L.S., 259, Hyde Park Road, Leeds.
1886. Rogers, Thomas, 27, Oldham Road, Manchester.
1893. Roseburgh, John, Market Square, Galashiels.
1892. Rosevear, John Burman, 109, New King's Rd., Fulham, London, S.W.
1877. Scharff, Robert F., Ph.D., B.Sc., M.R.I.A., Tudor House, Dundrum, Dublin.
1895. Schill, C. H., Broome House, Didsbury, near Manchester.
1886. Scott, Thomas, F.L.S., 3, Menzies Road, Torry, Aberdeen.
1893. Shackelford, Rev. Lewis John, 16, Pimlico Road, Clitheroe, Lancs.
1892. Shillito, John G., 20, Elmore Road, Sheffield.
1895. Sich, Alfred, F.E.S., Brentwood, 65, Barrowgate Rd., Chiswick, Middlesex.
1896. Sidebotham, Dr. E. J., Erlesdene, Bowdon, Cheshire.
1884. Skilton, Mrs. Mary, 21, London Road, Brentford, Middlesex.
1886. Smart, Rev. R. W. J., M.A., Parkham Rectory, Bideford, N. Devon.
1886. Smith, Edgar A., F.Z.S., Natural History Museum, S. Kensington, London, S.W.
1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth St., Topsham, Exeter.
1899. L Smith, Mrs. Lucy A., Cricklade Street, Cirencester.
1894. Smith, Wm. Chas., Vanston House, 7, Vanston Place, Walham Green, Fulham, London, S.W.
1896. Smith, Wm. Rayson, Harleston, Norfolk.
1900. Solly, E. H., 3, South Street, Deal, Kent.
1886. L Somerville, Alexander, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow
1887. Somerville, Rev. James E., M.A., B.D., Castellar, Crieff, N.B.
1886. Sowerby, Geo. Brettingham, F.L.S., 15, Station Parade, Kew Gardens.
1892. Span, Bartlet, Woodlands, Tenby, South Wales.
1896. Sparkes, Thomas, 92, Heywood Street, Moss Side, Manchester.
1900. Stacey, John, 22, Nithdale Road, Plumstead.
1886. Standen, Robert, 113, Sewerby Street, Alexandra Park, Manchester.
1888. Stanley, Frederick, Rokeby, Edgar Road, Margate, Kent.
1888. Stirrup, Mark, F.G.S., High Thorn, Bowdon, Cheshire.
1896. Stonestreet, Rev. W. T., 12, Wellington St., Higher Broughton, Manchester.
1885. Storey, J. A., B.A., St. Joseph's High School, Cardiff.
1897. Stracey, Bernard, M.B., Crichton Royal Institute, Dumfries.
1890. Stubbs, Arthur Goodwin, Staincliffe, Granville Road, Eastbourne.
1893. Stump, Edward Consterdine, 16, Herbert St., Moss Side, Manchester.
1899. Sturt, W. Neville, India Office, Westminster, London, S.W.
1895. Swanton, E. W., The Educational Museum, Haslemere.
1888. Sykes, Ernest Ruthven, B.A., 3, Gray's Inn Place, Gray's Inn, London.
1895. Sykes, Robert Dardsley, Lostock Hall, near Preston.
1895. Taylor, Frederick, 38, Landseer Street, Park Road, Oldham.
1897. Taylor, Rev. George W., F.R.S. Canada, F.Z.S., F.E.S., Gabriola Island, Nanaimo, British Columbia.
- O Taylor, John W., F.L.S., North Grange, Horsforth, Leeds.

1895. Thompson, Isaac C., F.L.S., 53, Croxteth Road, Liverpool.
 1886. Tomlin, J. R. Brockton, B.A., Stancliffe Hall, Derbyshire.
 1896. Tregelles, George Fox, 5, Clarence Place, Barnstaple.
 1897. Tripe, Linnæus, Major-Gen., 3, Osborne Villas, Stoke, Devonport.
 1897. Tulk-Hart, Eugene John, M.D., M.R.C.S., 4, Gloucester Place, Brighton.
 1898. Turner, E. Hartley, A.C.A., 21, Bairstow Street, Preston.
 1880. Tye, G. Sherriff, 10, Richmond Road, Handsworth, Birmingham.
 1899. Vaughan, J. Williams, J.P., The Skreen, Erwood, R.S.O., Radnorshire, S. Wales; winter address: Bryn-y-Mon, Tenby, S. Wales.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea.
 1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan, U.S.A.
 1886. Watson, Rev. Robert Boog, LL.D., B.A., F.R.S.E., F.L.S., 11, Strath-earn Place, Edinburgh.
 1905. Watson, Hugh, The Ridgeway, Haslemere, Surrey.
 1900. Webb, Walter, F., Albion, New York, U.S.A.
 1895. Webb, Wilfred Mark, F.Z.S., 7, Campbell Road, Hanwell, London, W.
 1895. Welch, Robert John, 49, Lonsdale Street, Belfast.
 1897. West, H. J., 80, Upland Road, East Dulwich, S.E.
 1886. Whitwell, Wm., F.L.S., 4, Thurleigh Road, Balham, London, S.W.
 1889. Williams, John M., 4, Exchange Alley, Liverpool.
 1891. Williamson, Rev. Charles Arthur, M.A., 14, Upper Mount Street, Dublin.
 1899. Wilson, Arthur Ernest, 228, Victoria Street, Grimsby.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1901. *L* Woodruffe-Peacock, Rev. E. A., F.L.S., F.G.S., Cadney, Brigg.
 1898. Woods, Henry, M.A., F.G.S., St. John's College, Cambridge.
 1886. *L* Woodward, Bernard B., F.G.S., F.R.M.S., 120, The Grove, Ealing London, W.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.

Changes in Generic Names in the Pyramidellidæ.—In the Proceedings of the Royal Irish Academy, ser. 3, vol. 5, no. 1, 1898, I proposed the name *Spiralina* for the group typified by Montagu's *Turbo spiralis*, and the name *Jordaniella* for Montagu's *Turbo nivosus*. It appears that the name *Spiralina* is preoccupied and that in the fishes there is a *Jordanella*, a name inconveniently similar to that I proposed. Consequently a change being necessary I suggest *Spiralinella* (type *Turbo spiralis*) for the former and *Jordanula* (type *Turbo nivosus*) for the latter. The Marquis of Monterosato in a letter to me points out that *Noemia* de Folin cannot stand, as the name is preoccupied in the coleoptera. He suggests *Oda* as a generic title for Jeffreys' *Odostomia dolioleiformis*.—G. W. CHASTER. (*Read before the Society*, Dec. 12th, 1900).

LIST OF BRITISH MARINE MOLLUSCA & BRACHIOPODA.

PREPARED BY A COMMITTEE OF THE CONCHOLOGICAL SOCIETY.

As no list of British Marine Mollusca has been published for fourteen years, the undersigned were appointed a Committee to prepare a new one, incorporating the results of recent researches.

The British area for this purpose has been taken as defined by the Rev. Canon Norman, with the addition of the Channel Islands (*Ann. and Mag. Nat. Hist.* (6) vol. 5, p. 345, 454, 1890).

In the matter of classification the Committee have not followed any individual system, but have endeavoured to adopt the most recent views of specialists in each department. The tenth edition of the "Systema Naturæ" of Linné has been taken as the starting-point of binomial nomenclature. Authorities for species which have since their creation been transferred to different genera are given in parentheses.

Since Jeffreys' "British Conchology" still necessarily forms the text-book of our collectors, it has been thought advisable in those cases where the name adopted in this list differs from that used by Jeffreys to give the latter in square brackets: thus—

Pteria *Scopoli* [= *Avicula*].

When a variety only, and not the typical form of the species, is British, the name of the latter is placed in parentheses: thus—
(*clavatus Poli*)).

v. dumasi Payraudeau.

The names of a few species whose claims to be regarded as British are very doubtful have been placed in square brackets: thus—
[*islandicus Müller*].

A number of varietal names, apparently based merely on monstrous, stunted, aborted or young specimens, have been omitted.

The Committee have to acknowledge the kind assistance of the following gentlemen:—Messrs. W. H. Dall, J. T. Marshall, R. B. Newton, E. A. Smith, R. Standen, E. R. Sykes, B. B. Woodward, and the Rev. Canon A. M. Norman. These gentlemen must not, however, be held responsible for any of the shortcomings of the list.

The Committee have found the amount of agreement between different authorities greater than had been anticipated, but there are still many questions on which the discrepancies of opinion have been irreconcilable, and in some cases the members of the Committee have not been able to arrive at an agreement. The Committee feel therefore that the results of their efforts cannot be taken as in anyway final; if, however, they have succeeded in producing a document which will be a help to students of conchology the object of their appointment will have been fulfilled.

The Committee will be grateful for additions or corrections, as they hope to issue a revised edition at no distant period.

G. W. CHASTER, G. A. FRANK KNIGHT,
J. COSMO MELVILL, W. E. HOYLE (*Secretary*).
The Owens College,
Manchester.

MOLLUSCA.

AMPHINEURA.

APLACOPHORA.

CHÆTODERMATIDÆ.

Chætoderma *Lovén.*

nitidulum *Lovén.* 1

NEOMENIIDÆ.

Neomenia *Tullberg.*

carinata *Tullberg.* 2

dalyelli (*Koren & Danielssen*). 3

Rhopalomenia *Simroth.*

aglaopheniæ (*Kovalevsky & Marion*). 4

Myzomenia *Simroth.*

banyulensis (*Pruvot*). 5

POLYPLACOPHORA.

CHITONIDÆ.

Lepidopleurus *Risso* [= *Chiton*].

cancellatus (*G. B. Sowerby*). 6

scabridus (*Jeffreys*). 7

Hanleya *Gray* [= *Chiton*].

hanleyi (*Bean*). 8

Tonicella *P. P. Carpenter*

[= *Chiton*].

marmorea (*Fabricius*). 9

ruber (*Lowé*). 10

v. oblonga *Jeffreys*.

Callochiton *Gray* [= *Chiton*].

lævis (*Montagu*). 11

v. navicula *Jeffreys*.

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PROTOBRANCHIA.

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ARTICULATA.

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Macandrevia *King*[= *Terebratula*].cranium (*Müller*).v. oblonga *Jeffreys*.**Terebratella** *d'Orbigny*.spitzbergensis *Davidson*.**Terebratulina** *d'Orbigny*.[= *Terebratula*].caput-serpentis (*Linné*).v. septentrionalis *Couthouy*.septata *Philippi*.**Platidia** *da Costa*.anomoioides *Scacchi*.**Megathyrus** *d'Orbigny*[= *Argiope*].decollata (*Chemnitz*).cistellula (*S. V. Wood*).**Gwynia** *King* [= *Argiope*].capsula (*Jeffreys*).

Tapes geographicus and **T. pullastra**.—Mr. B. B. Woodward, in the last number of the *Journal*, considers Gwyn Jeffreys "in error," in uniting these two forms, and says "it would seem as though he had not looked up the authorities to whom he refers," judging them only from a comparison of their shells. Mr. Woodward, on the other hand, has looked up the authorities, but apparently ignored the shells, and pronounces them "quite distinct." When he writes, however—"Both *T. pullastra* and *T. geographicus* occur in the Mediterranean, a fact of which Jeffreys, evidently from the wording of his remarks, was unaware"—he is mistaken. Gwyn Jeffreys says of *T. pullastra*—"Throughout the European seas. . . . *T. geographicus* is undoubtedly the same species" (*Brit. Conch.*, vol. 5, p. 185). And again, "Finmark to Alexandria and Mogador" (*Proc. Zool. Soc.*, 1881, p. 717). Those interested in the subject should refer to the latter paper. (See also *J. Conch.*, vol. 8, p. 27, 1895). *T. pullastra* has not a single specific character apart from *T. geographicus*, and its one varietal character is only superficial—that of the geographical markings covering the posterior area only (as in some *T. pullastra*) instead of the whole valve. It is true the Mediterranean form (*geographicus*) is smaller, thinner, and more polished than the British one (*pullastra*), but those are attributes common to all the Mediterranean *Tapes*.—J. T. MARSHALL. (*Read before the Society*, December 12, 1900).

Notes on *Helicella Cantiana* as food for the Turridae.—I have already drawn attention to the above mollusc being eaten by birds of the Thrush family (*Sci. Gossip*, N.S., vol. 5, p. 366) at Reigate. During July last I was able to extend these observations. On July 11th I walked from Canterbury to Whitstable, looking for flint implements in certain spots on the plateau. On the high road by the side of the footpath I found the following specimens broken by birds: Two broken *Helicella cantiana* and two *H. nemoralis* within a few feet of each other, the *H. cantiana* together and the *H. nemoralis* together, three-quarters of a mile to the north of Blean; and about a mile and a half further north, one *H. cantiana* and two *H. nemoralis* (together) about six feet from each other, one of the latter was too crushed besides, and too fragmentary to produce. The presence of the two different species near each other shows that the birds are not driven to eat *H. cantiana* through absence of *H. nemoralis*.—R. ASHINGTON BULLEN, F.L.S. (*Read before the Society*, November 14th, 1900).

STATEMENT BY THE COMMITTEE
FOR THE

COLLECTIVE INVESTIGATION OF PHENOMENA CONNECTED WITH THE VARIATION
AND LIFE-HISTORY OF BRITISH LAND AND FRESHWATER MOLLUSCA.

(Read before the Society, Dec. 12th, 1900).

The Committee appointed by the Council consists of the following members:—Messrs. J. R. B. Masefield, F. Taylor, R. J. Welch, and A. E. Boycott (Secretary).

The object of the investigation is to enquire into points liable to general uncertainty and to local or other variation, and into the diffusion and dispersal of species, by collecting the results of the individual experience of many naturalists. It is hoped that points of difficulty may thus be elucidated, and data collected relative to the facts and circumstances of variation. A certain small number of subjects for enquiry will each year be selected by the Committee and published in the Journal. The Committee trusts that abundant reports will be received on these subjects. An epitome of such reports will be published in due course.

The locality for which each answer is recorded should be carefully mentioned, with, if possible, the number of the district (*i.e.* Watson's botanical districts, as adopted in the Society's Census of Distribution). Any circumstances of altitude, aspect, temperature, time of year, rainfall, nature of water, geological formation, vegetation, etc., which may seem desirable should also be given. When the subject admits, numerical expression should, if possible, be given to the returns. The nomenclature used will be that of the Society as contained in their List of British Land and Freshwater Mollusca. The fact that an observation has been already published is no bar to its inclusion in a return; it is, indeed, important that observations recorded in journals not readily accessible to the general conchological public should be communicated (with careful reference to the place and date of publication).

The Secretary will be glad to receive suggestions for subjects for enquiry.

The following five subjects for enquiry have been selected by the Committee for 1901:—

I.—Have you in any case found any species or variety of land-snail constantly associated with any particular plant?

II.—How far is the smell of “garlic” constantly associated with *Hyalinia alliaria*? Under what circumstances and at what seasons of the year is it most noticeable? Does *H. alliaria* seem to escape destruction by other organisms more than the rest of the genus? Is the smell of “garlic” found in other species and under what circumstances?

III.—Is there any preference shown by (1) *Helix aspersa*, (2) *Fruticicola rufescens* for the neighbourhood of human habitations and buildings? if so, what explanation do you consider the most probable?

IV.—What localities produce the largest specimens of *Anodonta*? Describe the nature of the water, soil, geological formation, etc., and give the dimensions and, if possible, the weight.

V.—In the genus *Helix*, when not indigenous, when and how were any of the species introduced? It is desired to put on record as far as possible the date of introduction of any species into any given locality, both from abroad into the British Isles, and also from one part of the British Isles to another.

All returns should be sent in on or before *September 1st, 1901*, to the Secretary, A. E. BOYCOTT, The Grange, Hereford.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

293rd (Annual) Meeting, October 27th, 1900.

Mr. E. R. Sykes, President, in the chair.

Donations to the Library announced and thanks voted:
The usual periodicals received in exchange.

Appointment of Scrutineers.

Messrs. R. Cairns and W. H. Heathcote were appointed Scrutineers.

Appointment of Auditors.

Messrs. C. Oldham and E. C. Stump were appointed Auditors.

Election of Members.

Mr. William Arthur Cockshott, 13, Tithebarn Street, Liverpool.

Candidates Proposed for Membership.

Mr. A. J. Jukes Browne; Mr. Frank F. Laidlaw; Mr. G. Penrose; and the Rev. E. A. Woodruffe-Peacock.

Resignation.

Mr. R. Garnett.

Annual Report and Balance Sheet.

The Annual Report of the Council (see p. 31), the Treasurer's Report, including the Balance Sheet for 1899 (see vol. 9, p. 314) and an interim Balance Sheet and Financial Statement for the current year up-to-date (see p. 32) were presented and adopted.

Alteration of Rules.

The alterations of rules, printed on the circular summoning the meeting, were moved on behalf of the Council; and after some discussion of the original motion and amendments it was resolved that to Rule 4 be added the words:—"If on December 31st of any year a member shall be three or more years in arrear with his or her subscription, the Council shall erase his or her name from the list of members, and shall take whatever steps seem desirable for recovery of the arrears. The Council shall further report the erasure of such names to the next meeting of the Society with a view to their publication in the Journal."

It was further resolved in Rule 8 for "one year" to read "two years."

Election of Office-Bearers.

The Scrutineers reported that sixty-three valid papers had been received, and that the list as nominated by the Council had been duly elected. It was then announced that since the issue of the nomination list Mr. Thos. Rogers had found himself unable to accept the post of Recorder to which he had been elected. It was therefore resolved that Mr. Lionel E. Adams be elected to the office thus vacated, and that Mr. Thos. Rogers be elected a Vice-President in the room of Mr. Adams. The Officers and Council in the list on p. 2 were then declared to be duly elected.

The Presidential Address

was then delivered by the retiring President, Mr. E. R. SYKES, who took for his subject:—"Conchology at the Dawn and Close of the Nineteenth Century" (see p. 34).

Exhibits.

By Mr. Thos. Rogers: Two drawers of Japanese land shells and one of marine shells, from Port Jackson.

By Prof. S. J. Hickson: A series of nidamental capsules, embryonic, and adult shells of the gigantic *Semifusus probosciferus* Lam., from Torres Straits (Haddon Coll.).

By Messrs. J. T. Marshall and J. Simpson: *Adula simpsoni* (Marshall), dredged in forty-five fathoms, east of the Orkneys.

By Mr. J. Ray Hardy: A case of Australian *Ostrea*, and *Ovula* (*Neosimnia*) *uniplicata* Sow. *in situ* on Gorgonia, from West Columbia.

By Mr. Fred. Taylor: A series of mollusca, collected at Wicken Fen, and *Physa heterostropha* Say, from canal at Guidebridge and Droylsden.

By Mr. C. E. Wright: *Amphipeplea glutinosa* Müll., living, from Deal.

By Mr. J. C. Melvill: *Pleurotomaria beyrichi* Hilg., *Voluta festiva* Lam., *V. aulica* var., *Mitra fergusonii* Lam., *M. idæ* Melv., *M. gigantea* Sow., *M. belcheri* Hinds, *Conus clytospira* Melv. & Stand., *Cypræa guttata* Gray, *Trivia galapagensis* Melv., *T. fusca* Gray, *T. californica* Gray, and *T. sanguinea* Gray, from various localities.

By the Rev. L. J. Shackelford: A collection of Australian Volutidæ, including: *V. exoptanda* Sow., *V. giintheri* E. A. Smith, *V. kreusleræ* Ang., *V. turneri* Gray, *V. marmorata* Swns., *V. elliotti* Sow., *V. reticulata* Lam., *V. norrisi* Gray, etc., and some exceptionally fine examples of *V. fulgetrum* Sow., *V. undulata* Lam., *V. vexillum* Lam., *V. fusiformis* Swn., and *V. imperialis* Lam.

By Mr. Thos. Edwards: Varieties of *Pterocera lambis* L., from Singapore.

By Mr. Wm. Blake: Species of *Achatina* and *Limicolaria*, from Ocilonda, Central Africa.

By Mr. J. D. Dean: A collection of marine shells from the coast of North Wales, chiefly Barmouth and Penmaenmawr.

By Mr. J. M. Williams: A number of rare and beautiful varieties of *Cypræa*, including *C. tigris* var. *badionitens*, *C. arabica* var. *nigra*, *C. lynx* var. *caledonica*, *C. caurica* var. *obscura*, *C. stolidus* var. *crossei*, *C. cribraria* var. *exmouthensis*, *C. moneta* var. *barthelenyi*, *C. mauritiana* var. *calyx-equina*, and colour-varieties of *C. nappa*, *C. pantherina*, *C. onyx*, *C. picta*, and *C. caput-serpentis*.

By Mr. E. R. Sykes: *Conus cedo-nulli* Klein.

By Mr. G. W. Chaster: *Succinea oblonga*, from several Irish localities, *Limnæa involuta*, sinistral *Helix nemoralis*, collected alive at Bundoran, *Helix lapicida* var. *alba* from Matlock, and some remarkable forms of *Limnæa peregra*, *Viviparus viviparus*, and "repaired" *Helix nemoralis*.

By Mr. J. Hill: *Succinea putris* and *Limnæa stagnalis* from Derby, *Helix aspersa* var. *exalbida*, and a series of varieties of *H. nemoralis* from Mablethorpe.

By Mr. Edward Collier : *Succinea oblonga* var. *arenaria* from Enniskillen and shore of Lough Erne ; *Helix nemoralis* vars. *major*, *minor*, *roscozonata*, and *citrinonata* from county Sligo.

By Mr. J. Linton : A series of *Limnæa peregra* and *L. auricularia*, shewing intermediate stages between the two forms, collected during several successive years from one pond ; also varietal forms of *Limnæa stagnalis*.

By Mr. L. St. G. Byne : An exceptionally fine set of *Cypræa lurida*, dredged alive off Palermo.

By Mr. G. B. Sowerby : *Voluta junonia* Ch., *V. elongata* Swns., *V. sophia* Gray, and *V. pulchra* Sow., all especially fine ; *Conus ammiralis* L., *C. archithalassus* Dill., *C. aurisiacus* L., *C. nobilis* L., *Cypræa umbilicata* Sow., *C. sulcidentata*, Gray, *Murex marcoensis* Sow., *Buccinum striatissimum* Sow., *Chrysodomus intersculptus* Sow., *Siphonalia pfeifferi* Sow., *Pecten swifti* Bern., and many other rare and interesting species.

By Mr. W. H. Heathcote : *Leptocoelus cuvieri*, *L. peroni*, *L. cumingi*, *L. lamarki*, *L. robillardi*, and *L. striatus* ; *Coralliophila madreporarum*, *Acera tenuis* and *A. soluta* ; *Dolabella gigas* and *D. rumphii* ; *Rhodia gigantea* ; *Pusionella rapulum* ; and *Tectura fragilis*.

By Mr. R. Standen : *Latiaxis matvie* Gray ; varieties of *Strombus urceus* L. ; British species of *Scalaria*, from many localities.

The collection of Tenby and Gloucester land and freshwater mollusca, presented to the Society by Mr. A. G. Stubbs.

By Mr. R. Cairns : A large series of *Cypræa mappa*, illustrating variation in basal coloration, and many fine varieties of other species of *Cypræa* and *Trivia*.

By the Manchester Museum : (a), a beautiful specimen of *Pleurotomaria adansoniana* Crosse & Fischer, obtained by Surgeon Colonel S. Archer in Barbados, and recently presented to the Museum. This is the fifth specimen known to exist of this magnificent species ; (c), the animal of *Pleurotomaria beyrichi* Hilg. (in spirit) ; (d), a fine set of land and freshwater shells from Tanganyika, Central Africa ; (e), specimens of pumice stones found floating and cast up on Mauritius, in 1885, supposed to have come from Krakatoa : during the long ocean voyages they have become covered with shells of *Spondylus*, *Ostrea multiradiata*, *Perna imbricata*, *Meleagrina ala-perdicis*, etc., in all stages of growth ; (f), a large collection of marine mollusca from Denman's Island, Vancouver, and British Columbia ; (g), two drawers of rare bivalves from China, Philippines, and Australia ; (h), *Scalaria magnifica* Sow. and *Rostellaria powisi* Pet., a fine pair of each ; and the collections of *Glandina*, *Ennea*, *Streptaxis*, *Cochlostyla*, *Nanina*, *Helix*, *Bulimus*, etc. ; (i), cast of a limestone slab, showing tracks of a Cephalopod (*Acanthoteuthis*) in the Berlin Museum.

ANNUAL REPORT, 1899-1900.

THE Council have to report that the past year has been one of great activity in the society's work.

Fifteen new members have joined the Society since the last annual meeting, but the Council have also to report four resignations and two deaths, hence the total number of members is now 263 as against 254 last year. Of these ten are honorary and the rest ordinary members. The list of honorary members remains unchanged. It is with deep regret that the Council have to report the deaths of two valued members of the Society : Sir Rawson William Rawson and Mr. Edgar Leopold Layard, accounts of whose lives will be found in the pages of the Journal.

There have been nine meetings since the last annual meeting at Stafford. As the Treasurer's Report shows, the adverse balance is materially diminished owing to the generosity of many of the members, so that the Society is in a better financial position than it was last year.

The monthly meetings held at the Manchester Museum have been on the whole well attended, and the number of papers, notes, and exhibits show no sign of decreasing. As usual, no meetings of the Society were held in July and August.

On October 22nd, 1898, the Council appointed a Committee, consisting of the following gentlemen:—Mr. J. Cosmo Melvill, Rev. G. A. Frank Knight, Dr. Chaster, and the Secretary, to draw up a revised list of British marine mollusca. They have now pleasure in reporting that the list is nearly completed and will probably appear in the January number of the Journal.

At the suggestion of Mr. A. E. Boycott, the Council have appointed a Committee, consisting of Messrs. J. R. B. Masefield, F. Taylor, and R. J. Welch, with Mr. A. E. Boycott as Secretary and Convener, to consider and, as far as practicable, to carry out collective investigation into the phenomena connected with the variation and life-history of land and freshwater mollusca.

Four numbers of the Journal have been published during the current year, containing 138 pages and one portrait. This completes the ninth volume of the Journal and the second since it was transferred to the Society. To meet the wish expressed by some members, a much fuller index than that in the previous volume has been appended to this one, and it is hoped that the increased utility will justify the extra cost.

During the past year the Society's Cabinet has been indebted to Mr. J. Bliss and Mr. A. G. Stubbs for donations. In addition to the usual periodicals the Society's Library has been enriched by contributions from members of the Society and others, among whom may be mentioned:—Messrs. G. W. Chaster, W. H. Dall, G. K. Gude, A. S. Kennard, W. Kobelt, J. Cosmo Melvill, R. Standen, A. G. Stubbs, E. R. Sykes, Bryant Walker, W. F. Webb, W. M. Webb, and B. B. Woodward.

The Curator has given considerable assistance during the past year to members in the way of naming specimens for them, but the Council think it necessary once more to draw attention to the fact that such work forms no part of the Curator's official duties. Members may be assured that every care is taken of specimens sent by them to the Manchester Museum for comparison or identification, but neither the members of the Museum staff nor the officers of the Society can be held responsible in case of accident. The Curator would suggest that, to facilitate this work and diminish the risk of accident, members should in forwarding shells to be named, confine themselves to species belonging to one family only at a time, and pack each species in a separate box, or at all events in a separate paper. In this form they can usually be dealt with at once, and the delay and risk consequent upon the handling of a large miscellaneous consignment thereby avoided.

TREASURER'S REPORT.

The Balance Sheet for the year 1899 will be found printed in the April number of the Journal for this year (vol. 9, p. 314). In bringing forward the interim Balance Sheet for the present year, the Council are pleased to be able to state that the adverse balance shown in last year's report has, owing to the generosity of various members, entirely disappeared, and the Treasurer is enabled at the present moment to show a balance in hand of £13 4s. 5d.

In response to the special appeal sent out in February last, a sum of £41 13s. 6d. has been received by the Treasurer, and the Council takes this opportunity of thanking the members for the efforts made in improving the financial position of the Society, which is now on a better footing than ever. Funds are, however, still much needed for purposes of illustration, and any help from members for this purpose will be welcome. Under the heading of "Sale of Publications," there is included a sum received from the London publishers, amounting to £24 16s. 10d. for copies of the Journal sold from January, 1896, to March, 1900. The third and last payment of £10 for the purchase-money of the stock of back numbers of the Journal having been paid, this item of expense will no longer appear in the accounts. The amount received by the Librarian for the sale of back numbers has been only £1 14s. 9d. The cost of printing the October number of the Journal, viz., £15 12s. 6d., has yet to be paid, as well as Reprints, etc., £6 13s. 3d. These items will more than absorb the balance now in the Treasurer's hands.

The interim Balance Sheet, made up to October 25th, 1900, is appended as follows :—

INTERIM BALANCE SHEET to Oct. 25th, 1900.

| Receipts. | £ | s. | d. | Expenditure. | £ | s. | d. |
|-----------------------------|-------------|-----------|----------|----------------------------------|-------------|-----------|----------|
| Subscriptions | 54 | 10 | 0 | Balance due to Treasurer ... | 5 | 8 | 9 |
| Advertisements | 2 | 0 | 0 | Room for Annual Meeting at | | | |
| Sale of Publications | 26 | 11 | 7 | Stafford, 1899 | 1 | 10 | 0 |
| Donation | 1 | 4 | 6 | Third Payment to Mr. Taylor | 10 | 0 | 0 |
| Special Donations | 41 | 13 | 6 | Plates | 1 | 3 | 7 |
| | | | | Additions to Library... | 6 | 5 | 3 |
| | | | | Reprints | 4 | 7 | 11 |
| | | | | Stationery | 4 | 6 | 11 |
| | | | | Six numbers of <i>Journal of</i> | | | |
| | | | | <i>Conchology</i> , from April, | | | |
| | | | | 1899, to July, 1900 ... | 71 | 11 | 4 |
| | | | | Editor's and Secretary's Ex- | | | |
| | | | | penses | 5 | 10 | 0 |
| | | | | Treasurer's Expenses... | 2 | 11 | 5 |
| | | | | Balance in hand | 13 | 4 | 5 |
| | <u>£125</u> | <u>19</u> | <u>7</u> | | <u>£125</u> | <u>19</u> | <u>7</u> |

Subscriptions Unpaid for 1900 ... £6 10s. od.
 Arrears = £8 15s. od. ... say £4 0s. od.

294th Meeting, November 14th, 1900.

Mr. Thomas Rogers in the chair.

Donations to the Library announced and thanks voted :

Land and Freshwater Shells of Tenby, by A. G. Stubbs ; Spinning molluscs, by H. Wallis Kew ; Glycogen of Snails and Slugs, by Chas. Creighton ; Descriptions of new species of Japanese Land Shells (two pamphlets) ; New species of *Plectopylis*, from Tonkin, by G. K. Gude ; List of Slugs and Snails at Sutton Coldfield, by Albert Wood (*from the respective authors*) ; and the usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted :

A fine series of *Limnea peregra* and *L. auricularia* taken near Lichfield, and

showing intermediate stages between the two, presented by Mr. John Linton; *Paludestrina jenkinsi* Smith and var. *carinata*, from Shropshire Union Canal, Beeston Castle, collected Sept. 17th, 1900; also some unusually large specimens of var. *carinata*, from Sandbach, Cheshire, collected in September last; also *Sphærium pallidum*, adult and young, from Trent and Mersey Canal, Sandbach; *Helix fusca* from Swettenham; *Helix caperata*, *H. fusca*, and *Pisidium pusillum*, from Beeston Castle, Cheshire, presented by Mr. Charles Oldham.

Election of Members.

Rev. E. A. Woodruffe-Peacock, F.L.S., F.G.S., Cadney, Brigg.
Mr. G. Penrose, Curator of Royal Institution of Cornwall, Truro.
Mr. A. J. Jukes Browne, F.G.S., Etruria, Kent's Road, Torquay.
Mr. F. Fortescue Laidlaw, B.A., The Owens College, Manchester.

Candidate Proposed for Membership.

Mr. William Henry Chadwick.

Papers Read.

"On the Spreading of *Physa heterostrophæ* Say in Lancashire and Cheshire," by Mr. B. R. Lucas.

"*Paludestrina jenkinsi* (Smith) in Lancashire and Cheshire," by Mr. Charles Oldham.

"Notes on Colonies of Snails at high altitudes in Derbyshire," and "Notes on *Helix cantiana* as food for the *Turdide*," by the Rev. R. Ashington Bullen.

Exhibits.

By Mr. W. Moss: *Hybocystis elephas*, *Cyclophorus semisculpta*, and other land shells from Ipoh, Perak.

By Mr. F. Taylor: *Glandina truncata* in very fine condition, from Tampa, Florida; *Bythinia tentaculata* and *Paludestrina jenkinsi*, each in its youngest stages, for comparison with a shell he has recently discovered occurring abundantly in one of the canals near Manchester, and believed to be new to the British fauna.

By Mr. B. R. Lucas: *Paludestrina jenkinsi* from Sandbach and *Physa heterostrophæ* Say from the localities given in his paper.

By the Rev. R. A. Bullen: Specimens of Helicidae and *Hyalinia alliaria* from the Peak district of Derbyshire to illustrate his notes.

By Mr. Thos. Edwards: *Helix pomatia*, sinistral, and *Buccinum undatum*, dextral and sinistral examples with similar well pronounced carination of the whorls, from Thanet coast.

By Mr. R. Standen: A series of *Cancellaria*, recently presented to the Manchester Museum, with good examples of the various sub-genera.



On the spreading of *Physa heterostrophæ* in Lancashire and Cheshire.—

This species seems to have been with us for some time, but until recently has been overlooked. For my part I have several of its shells in my collection labelled "*Physa* (?)" of which I had taken no further notice until I saw Mr. F. Taylor's collection from Guide Bridge. I then looked up my specimens and find the following distribution for it. Shropshire Union Canal (Chester), canal at Gorton, canal at Droylesden, Trent and Mersey Canal, Sandbach. These finds date from end of 1897 to 1900, and constitute, I believe, a record both for Lancashire and Cheshire.—B. R. LUCAS.
(Read before the Society, November 14th, 1900.)

CONCHOLOGY AT THE DAWN AND CLOSE OF THE NINETEENTH CENTURY.

(The Presidential Address delivered at the Annual Meeting, Oct. 27th, 1900).

By E. R. SYKES, B.A.

At the close of the nineteenth century there arises a not unnatural feeling of enquiry as to the state of our favourite science, and one considers with a vivid interest the progress which has been made in various branches during the past hundred years. While many countries were in the year 1800 totally unknown from a malacological point of view, now we are in most cases able to form some general idea of their fauna. Our knowledge of the sea below the shore-line, again, has been obtained almost entirely during the past fifty years, and even now we are but on the threshold of the wonders of the deep ocean. Anatomical investigation, with a steadily increasing mass of material to work upon, has made progress; but the ideal classification, based as it must be on a combination of malacological and conchological characters, is yet to seek.

The dawn of the century, like its close, was a time of wars and rumours of wars, but with this difference, that while then war was taking place in Europe, now it is in distant lands, and the adverse influence on malacology is not so strong.

In an address of the present nature it is impossible to survey the entire field of molluscan work, and therefore it becomes necessary to select a few special points to consider as a means of estimating our progress and forming a comparison. Let us consider on the one hand the student in the year 1800, and on the other the worker of to-day; let us compare their relative advantages and disadvantages.

In the former case his text-book must have been the first edition of Martini and Chemnitz' "Conchylien-Cabinet"; also he would study the works of Linnæus, Gmelin, Rumphius, Bruguière, Müller, etc.; hardly any of Lamarck's or Cuvier's writings had yet appeared; collections were far fewer than at the present time, and correspondence with other workers was slow and costly; further, the pursuit of shell-collecting demanded a far longer purse than at the present time. We who can buy land shells from the interior of countries such as Borneo, Japan, etc., for a few pence, find it hard to realize that in 1786, at the Duchess of Portland's sale, *Acavus hæmastomus* for example, which even then must have been fairly well known, fetched the price of £3 3s., and *Anostoma ringens* £8 18s. 6d., compared with which a "wentletrap" for £7 7s. and *Conus aurisiacus* for £18 7s. 6d. must be considered cheap.

One striking feature of the dawn of the present century is the pre-eminence of the French workers ; save for the interesting though eccentric work of Poli, hardly a single author of that period who has left a great impression on malacology in general was a native of any other country. Cuvier, who published in 1798 his first system, which he devoted thirty years to improving, then divided the mollusca into Céphalopodes, Gastéropodes, and Acéphales. The Gastropods were again divided into those with and without shells ; the former group being also sub-divided into five sections, according to the form of the shell and the characters of the aperture. The Pelecypods, included in which we still find Ascidians, Brachiopods, and Cirripeds, were also sub-divided by the presence or absence of a shell and foot.

Lamarck in 1799, without apparently a full knowledge of Cuvier's work, gave to the world his first classification, which in 1801 he re-issued with vast improvements and alterations. Practically all of the genera, for example, proposed by him stand in use at the present day. In 1800 Férussac issued his first classificatory paper, shortly to be followed by many other important works. Passing by Bosc and Draparnaud, we come to Montfort, whose work is rated to-day far higher than in the middle of the century, when he was described as the "Baron Münchhausen of conchologists." From 1815 onwards we have to thank Blainville for much good work.

In our country the study of the British mollusca proved far more attractive than the larger and broader work of classification ; such writers as Montagu, Donovan, Maton and Rackett, Pennant, Turton, etc., being specially noteworthy ; but ere Gray's arrangement of the mollusca in 1821, but little general work was done, the most important books of the time published in England being the Sowerbys' "Genera," Wood's "Index Testaceologicus," and Perry's "Conchology."

Subsequently the amount of fresh material which came to hand, specially through the researches of Cuming, caused a shifting of the conchological centre of gravity, and just before the middle of the century the work of Reeve, Sowerby, etc., caused this country to hold a place in the first rank. Germany, through Pfeiffer, Küster, etc., then comes to the fore.

As a means of shewing the development of our favourite study, we may consider for a few minutes the origin and growth of specialist societies and periodicals.

An early attempt to found a society in London, specially devoted to the study of the mollusca, under the title of "Malacological and Conchological Society" was made by Sowerby in 1838 with his "Malacological and Conchological Magazine" ; he, however, was somewhat in advance of his times, and the periodical met an early death, only two numbers appearing. Apart from an attempt by

Guérin-Méneville, no other specialist periodical was published till the "Zeitschrift für Malakozoologie" was issued by Menke in 1844, which, with a change of title to "Malakozoologische Blätter" in 1854, survived until 1891. In 1850, the most celebrated of all conchological periodicals, the "Journal de Conchyliologie," due to Petit, was issued; it has survived for fifty years, and is we trust still in its youth, the fears that the lamented death of Crosse might cause it to cease having happily been dissipated. Strobel, in 1853 and 1854, published two volumes under the title of "Giornale di Malacologia."

In 1863 the Société Royale Malacologique de Belgique was founded, and its "Annales" have regularly appeared. The "American Journal of Conchology," containing many valuable papers, was issued from 1865 to 1872. The impulse given to the study in Germany by the "Zeitschrift" led in 1868 to the foundation of the "Malakozoologische Gesellschaft," and its "Nachrichtsblatt" has ever since appeared, supplemented from 1874 to 1887 by the "Jahrbücher." In Italy the "Bullettino Malacologico Italiano" ran from 1868 to 1875, followed by the "Bullettino della Società Malacologica Italiana," which still appears. Our own Journal dates from 1874. In 1883 there was founded the "Société Malacologique de France," whose founders appear to have considered that a proper course was "d'élever au rang spécifique toute forme se distinguant de ses voisins au moins par trois caractères, et de rejeter, à celui de variété, toute autre séparée par un nombre inférieur de signes différentiels." They appear to have lost sight of the fact that zoology is not a series of mathematical problems, and that a difference which may in some genera be very important in others will prove of no value. Sculpture on a Helicoid land shell, for instance, is usually of specific value, while on a Melanian it will vary greatly. Pease, again, stated that the colour-pattern on a Nudibranch was often of generic value, while in other groups it may not even be a specific character. The "Bulletins" ran from 1884 to 1891. In 1886 Mr. Averill commenced his "Conchologists' Exchange," which ceased in 1888, and was succeeded in 1889 by the "Nautilus," conducted by Mr. Pilsbry, the only monthly molluscan periodical now existing. Mention amongst societies may be made of the "American Association of Conchologists," which has no separate periodical. In 1891 the "Conchologist" was founded, its title being changed to the "Journal of Malacology" in 1894; and in 1893 Sowerby's hope of over fifty years before was fulfilled, and the Malacological Society of London was founded and commenced to issue its "Proceedings."

One curious feature of almost all societies and journals may be pointed out, namely, that whatever their original plan may be, they drift into giving more attention to recent than to fossil molluscs.

Possibly this may be due to the fact that palæontologists usually devote themselves to one special formation alone, and therefore a general support is not forthcoming.

As another comparative test we may note that at the commencement of the century only about forty or fifty new species were described every year; whereas to-day we have to record something like two hundred new genera or sub-genera (recent and fossil) and nearly one thousand living species.

At the present day generic monographs abound, good faunistic works are numerous; societies such as ours are found in many countries, and periodicals devoted to our special study vie with one another in giving to the world the latest discoveries. Conchology has ceased to be the pastime of the rich, and has become the study of those whose purses could not in bygone days reach the price of specimens. Exchange of duplicates has, owing probably in a large measure to cheaper rates of carriage, become systematized and largely developed; although, of course, some form of it must have taken place in bygone days, the earliest "exchange list" that I have seen is one distributed by Menke to accompany his well known "Synopsis" of 1828. It was in manuscript, and entitled "*Catalogus testarum moluscorum quæ supervacane prostant apud Car. Theod. Menke, M.D.*" It contained the names of 207 Gastropods and 58 Pelecypods; all the land and freshwater shells being European.

Still, this very abundance of literature has to us its disadvantages; almost every shell which has been known for more than, say, ten years has its synonymy; authors with insufficient material and a zeal for "species-making" have crowded and overburdened our lists with a mass of names for indistinguishable forms and varieties. At the present time no one probably would maintain that, for instance, the European *Xerophila*, or the North American *Unionidæ*, consist of nearly as many species as there are admitted names, and one of the most serious tasks which will lie before the students of the coming century will be to reduce chaos in these and many other groups to something resembling order.

The rules of nomenclature, also, though obeyed in theory, are broken in practice by many leading workers again and again. In our own experience as students of British shells we find that in the same lists some of Da Costa's names are used, others not; one great difficulty being that while these rules most carefully provide that binomial nomenclature is to be used, they throw no light on the question as to whether an author is to be recognized who is partly binomial and partly non-binomial in the same volume or series of volumes.

The relations between the Tertiary, Post-Tertiary, and recent faunas of the British Islands form a problem upon which much light is

needed ; at present there is but little certainty as to how far back the actual species of our marine fauna may be traced, the views of Jeffreys and Searles Wood, the only two authors who in this country have given special attention to the question, being in direct conflict.

Another problem which lies still before us, and needs far more knowledge than we at present possess for its solution, is as to the effect of surroundings upon molluscan life in the production of marked and persistent variations. Take for example some of the *Achatinellæ* which are found as commonly sinistral as dextral. The cause of this is yet to seek ; it has been, however, suggested that sinistral specimens of *Melantho* are due to crowding in the embryonic stages. Again, how can we explain the occurrence in one particular locality of specimens of *Buccinum undatum* having two, and even three, opercula ? There is, therefore, no lack of questions which invite study from the worker of the present day.

Looking back, we realize that the past hundred years have been times in which descriptive work has flourished ; often it is to be feared at the expense of accuracy and deeper research. The advances made in our knowledge of anatomy bear no comparison to the study of the shell¹; much, too, is it to be regretted that the zeal of authors for the describing of novelties has again and again caused them to rush into print without a sufficiently careful study of the works of their predecessors, and their successors will have no light task before them.

The close of the nineteenth century is, to use a commercial expression, a time to "take stock," and to consider what progress has been made. It is with one of these forms of estimating our present position that I propose for a few minutes to concern myself, and specially with an endeavour to arrive at some idea of the actual number of species of recent mollusca which are now known to science. Any such estimate can but be approximate, but a survey of the most recent monographs enables one to form a fairly accurate conception.

The classic starting-point for such a calculation, as indeed for all other systematic molluscan work, is the tenth edition of Linnæus' "Systema Naturæ." His "Vermes Testacea" number 703, but he includes *Serpula* and other non-molluscan genera, while his "Vermes Mollusca," of which, again, only a portion are really molluscs, are 69. Roughly speaking, therefore, the known species of mollusca at this date were about 700. After this the steady influx of newly-described species gradually increases the number nearly every year ; Müller, for example, in 1773, admits 398 land and freshwater forms. Steadily the exploration of new countries added to the catalogues, and Dillwyn in

¹ Mr. M. F. Woodward : "I can only impress on all collectors abroad the desirability of preserving the animals as well as the shells, not merely of their new finds, but of the commonest forms, hardly any of which are properly known."

1817 was enabled to enumerate 2,244;¹ which we may divide into *Cephalopoda*, 45; *Gastropoda*, 1,510; *Scaphopoda*, 15; *Pelecypoda*, 638; *Polyplacophora*, 36. It may, perhaps, be of interest to note the genera with the numbers admitted in each:—*Chiton*, 36; *Pholas*, 11; *Mya*, 38; *Tellina*, 81; *Cardium*, 46; *Macra*, 38; *Donax*, 21; *Venus*, 113; *Spondylus*, 3; *Chama*, 25; *Arca*, 45; *Ostrea*, 83; *Anomia*, 30; *Mytilus*, 48; *Pinna*, 20; *Argonauta*, 9; *Nautilus*, 36; *Conus*, 160; *Cypræa*, 70; *Bulla*, 60; *Voluta*, 188; *Buccinum*, 158; *Strombus*, 43; *Murex*, 164; *Trochus*, 128; *Turbo*, 163; *Helix*, 191; *Nerita*, 65; *Haliotis*, 17; *Patella*, 103; *Dentalium*, 15; *Teredo*, 4.

Attention may be called to the large proportion of marine as compared with land forms, and to the fact that over sixty years had only resulted in the addition of 1,500 species to the lists. After this date systematic and descriptive work continued with increased energy, and within forty years the number had become swollen by over 15,000.

The brothers Adams' (1853-1858) in their classic work admitted the following:—*Octopoda*, 66; *Decapoda*, 125; *Polypoda*, 6; *Pteropods*, 75; *Pectinibranchiata*, 5,954; *Scutibranchiata*, 1,634; *Chitons*, 216; *Tectibranchiata*, 319; *Nudibranchiata*, 311; *Heteropoda*, 70; *Inoperculata*, 3,756; *Operculata*, 850; *Pholadacea*, 418; *Veneracea*, 1,883; *Lucinacea*, 1,236; *Pectinacea*, 721.

Applying the same principles to these totals we arrive at:—*Cephalopoda*, 197; *Gastropoda*, 12,604; *Scaphopoda*, 46; *Pelecypoda*, 4,258; *Polyplacophora*, 216. It should, however, be borne in mind that many of their names were, and even now are, *nomina nuda*.

Treating Paetel's well-known work (1888-1890) in the same way we get:—*Cephalopoda*, 305; *Pteropoda*, 119; *Heteropoda*, 65; *Gastropoda*, 34,950; *Scaphopoda*, 137; *Polyplacophora*, 439; *Pelecypoda*, 8,467. Dividing them in the generally recognized manner, we arrive at:—*Cephalopoda*, 305; *Gastropoda*, 35,134; *Scaphopoda*, 137; *Pelecypoda*, 8,467; *Polyplacophora*, 439; or a total of 44,482 species.

The next question with which we are confronted is to determine what addenda we should make for the period which has elapsed since this work was compiled, so as to bring the totals up-to-date for the close of the year 1900.

Dealing firstly with the *Cephalopoda*, the most complete recent catalogue is that of Hoyle in 1886, with his addenda included, so as to bring the list to the close of 1896. From these we get a total of 469. From the Zoological Records of 1897-9, we add eleven, and, on an average, we may include four for 1900; we therefore estimate the known *Cephalopoda* at 484.

Next, turning to the *Gastropoda*, the most recent catalogue of the *Cyclophoridae*, *Cyclostomatidae*, and allies, namely that of Kobelt and

1 All the following figures are arrived at by actual enumeration.

Mcellendorff, yields about 2,445 species, and if we add forty-eight species from the Zoological Record of 1899, and estimate a similar number for the year 1900, we get 2,541. The other *Gastropoda* as listed by Paetel are 33,084 in number. From the Zoological Record we get (omitting *Cyclophoridae*, etc., as above mentioned):—

| | | | | | | | |
|------------------------|-----|-----|-----|------------------------|-----|-----|-------|
| 1888 | ... | ... | 528 | 1895 | ... | ... | 537 |
| 1889 (aver. of 3 yrs.) | 456 | | | 1896 | ... | ... | 567 |
| 1890 | ... | ... | 392 | 1897 | ... | ... | 746 |
| 1891 | ... | ... | 447 | 1898 | ... | ... | 590 |
| 1892 | ... | ... | 740 | 1899 | ... | ... | 710 |
| 1893 | ... | ... | 340 | 1900 (aver. of 3 yrs.) | 682 | | |
| 1894 | ... | ... | 661 | | | | 7,396 |

Therefore, estimating in this manner, we arrive at a total of 43,021 *Gastropoda*.

As to the Scaphopods, the most recent monograph, by Pilsbry and Sharp, yields 238 species; if we add the single one in the Record of 1899 and another for 1900, we have 240 species.

For the *Pelecypoda* we have, from Paetel, 8,467. The Zoological Record yields:—

| | | | | | | | |
|------|-----|-----|-----|------------------------|-----|-----|-------|
| 1891 | ... | ... | 107 | 1897 | ... | ... | 149 |
| 1892 | ... | ... | 57 | 1898 | ... | ... | 156 |
| 1893 | ... | ... | 62 | 1899 | ... | ... | 123 |
| 1894 | ... | ... | 91 | 1900 (aver. of 3 yrs.) | 142 | | |
| 1895 | ... | ... | 87 | | | | 1,056 |
| 1896 | ... | ... | 82 | | | | |

The grand total then becomes 9,523.

Finally, we turn to the *Amphineura*. Here from Mr. Pilsbry's work we get: *Polyplacophora*, 540; *Aplacophora*, 33. Adding from the Zoological Record in a precisely similar manner we have to include *Polyplacophora*, 59; *Aplacophora*, 4; and we get a final total of 636.

The next question which arises is, how far are the above totals trustworthy? On the one hand they are inflated by a mass of synonyms which still masquerade as species, while on the other hand they are reduced by a certain number of omissions. The only omission of any importance, however, will, I think, be found in the *Nudibranchiata*, of which the true total is, owing to the nature of the works consulted, unduly curtailed.

Making a reduction, therefore, for synonyms and allowing for the above, I think a very fair approximation will be:—

Cephalopoda, 450; *Gastropoda*, 40,000; *Scaphopoda*, 220; *Pelecypoda*, 8,500; *Amphineura*, 600; or a grand total of 49,770—say 50,000 known species of recent mollusca.

When we consider that the known forms at the beginning of the century were probably under 2,000, we get some faint idea of the

enormous amount of descriptive work—good, bad, and indifferent—which has been done. Turning, in conclusion, for a moment from the level, but laborious, path of enumeration to the thorny track of prophecy, let us endeavour to form some conception of the direction that descriptive work will take and where the fields lie from which the most important additions will be made. For some period yet the ever-increasing exploration of islands and continents may well be expected to swell the catalogues of land-shells to the neglect of those of marine mollusca; then, gradually, as new discoveries in this branch become more difficult, collectors may turn back to the ocean, and explore deeper and with more facility by means which are ever-improving, so that the abyssal fauna, which at present is almost entirely unknown, will yield its vast results to swell the total, and, by the close of the twentieth century, that which we consider to be an enormous mass of known forms will seem to our followers but a mere atom in the sum of human knowledge.

Paludestrina jenkinsi (Smith) in **Cheshire**.—I have recently taken this species in three different localities in Cheshire, and have little doubt that, if looked for, it will be found in others. As the shell has now established itself in the canals of Staffordshire, Lancashire, and Cheshire, its dispersal will probably be accelerated, and we may reasonably expect that ere long it will become common throughout the country. On September 17th I collected about fifty examples on *Elodea canadensis* in the Shropshire Union Canal near Beeston Castle Station, and on the following day found the shell in hundreds on this plant in the Trent and Mersey Canal near Sandbach. On September 25th I obtained two dead shells from a short branch of the Peak Forest Canal, a few yards from the Cheshire bank of the River Tame at Dukinfield. Living examples were collected by Mr. F. Taylor at this locality a few days later. At Beeston Castle the type and the var. *carinata* occurred in about equal numbers, but at Sandbach nearly all the shells were referable to the variety, the carination varying in degree, and being very pronounced in some cases. The two Dukinfield shells were typical. Most, if not all, of the mature shells at Beeston Castle and Sandbach contained large numbers of fry ready for exclusion.—CHAS. OLDHAM, October 15th, 1900. (*Read before the Society*, November 14th, 1900).

Helix arbustorum at a high altitude.—I found *Helix arbustorum* on the summit of the Hasliberg Gummen, 7,147 feet above sea-level. It would be interesting if Alpine climbers would note the greatest heights at which they find any molluscs.—J. W. HORSLEY, St. Peter's Rectory, Walworth, July 28th, 1900. (*Read before the Society*, Sept. 12th, 1900).

LONDON BRANCH.—Annual Report.

Since our last report fourteen meetings have been held, half of which were field meetings. The Rev. J. W. Horsley, Messrs. J. C. Dacie, P. Lawson, and J. Moorcock have kindly allowed us to hold meetings at their houses during the past year. Our thanks are also due to Mr. Devine, of Clayesmore, for entertaining a party of our members on May 19th. Arrangements have been made for holding the winter meetings in the City; this will be convenient to most of our members and will we hope ensure a larger attendance.

November 3rd, 1900.

J. E. COOPER, *Hon. Sec.*

**MOLLUSCA COLLECTED BY
MR. RUPERT VALLENTIN AT STANLEY HARBOUR,
FALKLAND ISLES, 1897-99.**

BY JAMES COSMO MELVILL, M.A., F.L.S., AND ROBERT STANDEN,
ASSISTANT KEEPER, MANCHESTER MUSEUM.

(Read before the Society, June 13th, 1900).

WHEN this collection of mollusca was kindly placed in our hands for identification by Mr. Vallentin, it was intended that the whole of the zoological gatherings made by him should be published collectively, but it has unfortunately been impossible for him to have this good intention carried out. Although there is nothing of actual novelty amongst them, these mollusca are nevertheless of more than usual interest, for not only has great care been exercised in the collecting and preservation of them, but appended are copious notes, all the more valuable as taken on the spot: these we proceed to quote *in extenso* in the accompanying enumeration.

CEPHALOPODA.

Octopus tehuelchus d'Orb. ?—Mr. W. E. Hoyle informs us that two small Cephalopods, which we handed to him for examination, are probably the young of this well-known Patagonian species.

GASTROPODA.

PULMONATA.

Limnæa diaphana King.—“A large freshwater pool, about three-quarters of a mile due east of Stanley Harbour, contained a number of these molluscs, which were crawling about the sandy bottom in the bright sunshine” (R.V.). This appears to be the first instance, hitherto recorded, of the occurrence of a freshwater species in the Falkland Isles. It was described by King from specimens from the Straits of Magellan.

Siphonaria lessoni Blainv.—“Very common on rocks, hulks, and beams. Invariably found on the fringe of high water mark, and never elsewhere. Spawn deposited during January” (R.V.).

OPISTHOBRANCHIA.

Pleurobranchus patagonicus D'Orb.—Three examples. The mantle seems more effuse than in the figure given by Tryon after d'Orbigny.¹ Colour, a transparent white. The shell is more calcareous than are those of most other species of the genus. Low water.

¹ “Manual of Conchology,” vol. 16. pl. 74, fig. 92, 93.

PROSOBRANCHIA.

Voluta (Cymbiola) ancilla Sol.—York Bay, Port William, after easterly gales.

Voluta (Cymbiola) becki Brod.—One fine living specimen. Port William, a wild exposed bay.

Voluta (Cymbiola) magellanica Lam. — Dead shells only. Whale Sound, Stanley Harbour. This locality is mentioned by Mr. Vallentin as being absolutely land-locked.

Euthria antarctica Rve.—“Common under stones at low water. Spawns during January” (R.V.).

Euthria fuscata Brug.—On shore at low water.

Trophon cretaceus Rve.—It is not easy to differentiate this species from those examples of *T. geversianus* Pall., the lamellæ of which are more or less obsolete on the upper whorls. Indeed, we should not feel surprised at their being ultimately united as two extreme forms of one variable species. Scarce.

Trophon geversianus Pall.—“Fairly abundant in certain places in the harbour. It is known to the settlers as the ‘whelk.’ The deposition of the curious spoon-shaped nidamental capsules was first observed on the 15th December, and by the 10th of the following February the young fry were just beginning to hatch out. From some fragmentary observations, segmentation of the ova seemed to be the same as in *Nassa*. The ova are white in colour, and measure 1 mm. in diameter. This species appears to live exclusively upon two bivalves, *Mytilus edulis* and *Chione exalbida*, and has been observed to drill a hole through the valve of a *Mytilus* in two and a half hours” (R.V.). A considerable number of examples are in the collection, showing much variation in size, and number and disposition of the fimbriate longitudinal lamellæ. Some specimens nearly approach *T. cretaceus* Rve. This species (*T. geversianus*) has hitherto been mostly found in a dead condition, hence the fine dark umber coloration of the interior of the aperture is not often seen, and this is particularly noticeable in Mr. Vallentin’s splendid series. Stanley Harbour, on hulks and shores within tidal limits; York Bay, Port William, abundant on shore after easterly gales.

Monoceros calcar Mart. (= *M. imbricatus* Lam.).—We refer to our previous paper on the mollusca of Lively Island, Falklands, (vol. 9, p. 97) for the full synonymy of this extremely variable species. York Bay, Port William, found on shore after easterly gales.

Cerithium cælatum Couthouy MS.—Low water, spring tide.

Crepidula dilatata Lam.—“Mostly occurs under rocks and

stones about low water mark. Also cast up on exposed beaches after gales" (R.V.).

Lamellaria patagonica Smith.—Three species of this genus are reported from the Magellanic region. The shells of two of these, both described by Couthouy¹ as *Sigareti*, have not been described, but the soft parts nearly resemble the examples of the animals in the present collection. The shell alone of *L. patagonicus* seems known, and is identical with our examples. Low water, spring tides.

Natica impervia Phil.—"One strap of spawn belonging to this species was found in November during an extremely low spring tide" (R.V.).

Photinula expansa Sow.—"On the stems and roots of *Macrocystis*" (R.V.). 3 fathoms.

Photinula tæniata Wood.— $3\frac{1}{2}$ fathoms.

Fissurella picta L.—"Abundant, the shells of the largest specimens being invariably covered with foreign growths. In these the attachment between the animal and its shell is very slight indeed, a gentle tap from the toe of a boot being usually sufficient to separate one from the other" (R.V.).

Fissurella polygona Sow.—On shore, low water.

Fissurellidea hiantula Lam. (*non* Rve.).—"A single specimen found crawling on the mud inside a derelict vessel in Stanley Harbour" (R.V.).

Acmaea cæciliana D'Orb.—Identical with examples from Lively Island, Falklands, collected by Miss Cobb, which (vol. 9, p. 103) we referred to *A. texilis* Gould. Having subsequently forwarded one of our specimens to the Rev. G. W. Taylor, of Gabriola Island, B.C., who is engaged in a critical study of this very difficult genus, he writes that he considers *A. texilis* and the allied *A. persona* Eschz. to be molluscs entirely confined to the West American coasts, and that the only *Acmaea* likely to occur in the Magellanic province are *A. viridula* Lam., *A. cæciliana* D'Orb., and *A. variabilis* Rve. All these, he points out, are alike in the pale-green coloration of the interior, a peculiarity which is not found in limpets of this genus from any other part of the world. Low water.

Patella ænea Martyn.—"Common on rocks, stones, and piles of timber, from half-tide to low-water mark" (R.V.).

Var. **deaurata** Gmel.—Lake Point, after easterly gales.

Nacella cymbularia Lam.—"Common on stems of *Macrocystis* and *D'Urvillea*, at a depth of two fathoms, and found dead on shore after heavy gales" (R.V.). Hooker's Point and York Bay, Port William.

¹ Gould, "Wilkes Exped. Moll." p. 216-217, figs. 259-60.

POLYPLACOPHORA.

Tonicia atrata Sow. (= *Chiton atratus* Sow., Mag. Nat. Hist., N.S., vol. 4, 1840, p. 294).—Many examples of a very rare species, which has hardly been collected since the time the original specimens came to hand. The markings are exceedingly variable, as is the coloration, some being cinereous, others warm fawn or umber; others, again, mottled with light and dark hues. Some, too, are beautifully lineated with white or pale-grey. In all our examples, however, there is one uniform point of similarity, viz., the pale stramineous girdle, which is perfectly smooth and plane.

Tonicia lebruni Rochebrune. — A single example of a rare species, described by M. de Rochebrune so recently as 1884.

Callochiton illuminatus Rve. (= *Chiton illuminatus* Rve., Conch. Icon., t. 22, fig. 147, 1847).

Plaxiphora setigera King.—Two specimens.

PELECYPODA.

Mytilus edulis L.—“Very numerous. On the morning of Nov. 29th, 1898, a specimen placed in a pan of sea-water the day previous was found to have spawned. During the afternoon of the same day a number of mussels were detected in the act of spawning in several places in the harbour, the sea being calm, and the sun shining brightly at the time. Towards the end of the following month, when the tow-net could be used, their larvæ formed one of the commonest objects in the gatherings. By the 21st of January, 1899, these larvæ had settled down to various objects in the harbour, and it was noticed that while they seemed to avoid the kelp (*Macrocystis*), other marine weeds, Hydroids, Ascidians, and in fact everything available was simply covered with them. Soon after arriving at Stanley it was noticed that many of the beds of mussels, more especially in the neighbourhood of Whale Sound, contained a large percentage of dead shells, with the valves still united by the ligament. Enquiry elicited the fact that the previous winter had been one of exceptional severity, and doubtless the depopulation of these large areas was owing to this cause, the mussels having been frozen when uncovered at low water. Macgillivray¹ records a similar destruction of the mussel beds in Stanley Harbour. In many parts of the harbour the shells of this species, and also those of *Patella*, seem subject to erosion or decay in the shell substance; perforations appear, and the mollusc soon succumbs. Only specimens living on the shore are thus attacked, those on hulks and stone walls escaping. The disease is probably due to the rain-

1 “Narrative of the Voyage of H.M.S. ‘Rattlesnake,’” vol. 2, p. 200.

water saturated with peat which flows over the beds when exposed at low-tides" (R.V.).

Mytilus magellanicus Chem.—On Kelp, near Hooker's Pond; also from a beached hulk which had been moored for some time previously in the harbour" (R.V.).

Mytilus unguatus L.—Perhaps too nearly allied to *M. edulis* L., which occurs with it, but far less frequently. "The 'whelk' (*T. geverianus*) invariably attacks this species and *M. edulis*, leaving *M. magellanicus* untouched" (R.V.). On a hulk.

Modiolarca trapezina Lam.—"Juvenile examples, in size from 3-5 mm. longitudinally; are abundant on the fronds and stems of *Macrocystis* at a depth of two fathoms. Large examples are found on the various beaches, not uncommonly after southerly gales. A larger variety, again, of a particularly dark olive-green, is found under similar conditions, but full-grown specimens are always very difficult to procure, the steamer-duck (*Brachypterus micropterus*), which abounds in the harbour, diving for and eating them" (R.V.).

Saxicava antarctica Phil.—On beach, at low water.

Teredo palmulata Lam.—"This abounds in certain waterlogged vessels, and old timber. It has been found necessary to sheath in copper all submerged timber in this harbour, to protect it against the depredations of this destructive mollusk" (R.V.).

Chione (Omphaloclathrum) exalbida Chem.—"Occurs in abundance in the various sandy bays in the harbour, especially at Sparrow Cove, Port William. It is known to the Settlers as the 'Clam,' and is frequently collected for table purposes. It is usually to be found buried a little distance in the sand." The largest example in the collection measures 3.375 by 2.75 inches.

Cryptodon falklandica E. Smith.—Low water, spring tides.



Dates of Publication of Forbes & Hanley's "History of British Mollusca."—This was issued in monthly parts each usually with four plates (dated).

Vol. I., pp. 1-477 (=Pt. 1-12), 1848; pp. i.-lxxx., 478-486, and all titles, 1853.

Vol. II., pp. 1-480 (=Pt. 13-24), 1849; pp. 481-557 (=Pt. 25, 26), 1850.

Vol. III., pp. 1-320 (=Pt. 27-34), 1850; pp. 321-616 (=Pt. 35-42), 1851.

Vol. IV., pp. 1-302 (=Pt. 43-end), 1852.

These dates are based on Wiegmann's *Archiv f. Naturg.*, 1849, ii., pp. 77 and 106; 1850, ii., p. 103; 1851, ii., p. 104; 1852, ii., p. 263; 1853, ii., p. 94, and an incomplete copy with original covers in the possession of Mr. W. E. Hoyle.—B. B. WOODWARD (*Read before the Society*, February 13, 1901).

Notes from Porthleven, Cornwall.—It would be interesting and useful to those conchologists who are going to new places for their summer holidays, if those who have preceded them had made and published a few notes as to what was to be found in or near a holiday resort. Example being better than precept, let me say what I found when staying this August at Porthleven, a little fishing town, half-way between the Lizard and the Land's End. Weather unpropitious, it only raining twice in the three weeks of my stay; soil unpropitious, being mainly granitic or metamorphic, metalliferous but not mollusciferous. It was not a very long walk to North Cornwall, where I found forms larger, notably in the case of *Helix virgata* and *H. acuta*. The most common shells were *H. aspersa* and *H. nemoralis*. Both were mainly found in the stone walls overgrown with gorse, heath, brambles, and foxgloves, which here take the place of hedges. *H. aspersa* in the south was largely of the var. *undata* type; those in the north more nearly approached var. *flammea*. Nearly all were considerably weather-worn; *H. aspersa* and *H. acuta* were largely pairing and were the only species thus occupied. *H. nemoralis* showed a large proportion of red as against yellow shells. The variety *castanea* I only found at the Lizard near the signal station. Some that in the flesh appeared brown were found to have shells much more diaphanous than those of other tints. I found two specimens of var. *hyalozonata*, and in two hedges var. *albolabiata* occurred, and I secured fourteen specimens, some of which have a primrose-coloured lip. I found one shell that is the nearest approach to an indubitable "six-banded" I have observed, but it is frequently most difficult to distinguish between a 'split' and a band, and I believe, indeed, that the archetypal *Helix* had but one band, a peripheral one, from which two above and two below have developed by "splitting." Some were noticeably pyramidal in form, but these were not common as they are in some places, *eg.*, the Brighton Downs. *H. hortensis* was entirely absent; latterly I looked specially for it, but in vain. *H. virgata* was not common; where it did occur in any numbers I always found there was a clover-field on the other side of the wall; one exception was a cliff at Polurrian. In the south, as I have already noted, forms were small, in the north larger. Only once in the whole district I examined (Lizard to Penzance, along the coast, and Porthleven to Gwithian, crossing Cornwall) did I find var. *albicans*, so prevalent in most counties. The exception was near Marazion, but in all other places where *H. virgata* occurred var. *hypoazona* took its place, just reversing what would be the case in Kent. Var. *leucozona* was finest and most abundant on the Gwithian sand-dunes, where, indeed, it prevailed over all other varieties put together. Var. *alba* and var. *alba-hyalozonata* I found in a clover-field at Helzephron, where also to my great delight I took one var. *sinistrorsum*. Millions of *H. virgata* have I seen, myriads have I handled, thousands have I collected, but never before have I seen a reversed form. At Polurrian a form intermediate between var. *radiata* and var. *nigrescens* occurs. *H. acuta* occurred only sparingly and locally in the south, but abounded at Gwithian, where the beautiful var. *articulata* was common together with the type and var. *strigata*. *H. granulata* was fairly common, but local, and was obtained by beating or looking under hedge-cuttings. *H. revelata* I found only a few of, and these under stones. *H. caperata* fairly common, the var. *ornata* not so; *H. rufescens* rare; *H. rotundata* not particularly common. Of *H. itala* I found only a few small specimens at Gwithian. *Hyalinæ* few, but less dry weather might have brought more to light. I took two specimens of *H. draparnaldi* at Penrose, near Porthleven. Only two specimens of *Cochlicopa lubrica* came to hand. *Ancylus fluviatilis* was abundant on stones in Looe Pool. Marine shells apparently rare owing to the rocky shores, but *Littorina rudis* varied much in colour and banding.—J. W. HORSLEY, St. Peter's Rectory, Walworth. (Read before the Society, Sept. 12th, 1900).

NORFOLK MARINE MOLLUSCA.

BY ARTHUR MAYFIELD.

(Read before the Society, Dec. 12, 1900).

THE sandy shores of Norfolk are not, by any means, a happy hunting-ground for the collector of marine molluscs. The best localities are :

1. The Wash.
2. The shore from Wells-next-the-Sea to Hunstanton, where dead shells are thrown up amongst the drift rubbish in great abundance, but little variety.
3. The neighbourhood of Cromer, Runton, and Sheringham, where the chalk and flints form the beach between high- and low-water marks.
4. Breydon Water, a shallow brackish lake occupying 1,200 acres.

Along the eastern shores of East Anglia, from Palling-on-Sea to Felixstowe, there is a remarkable paucity of drift shells, doubtless owing to the rarity of easterly gales.

In the following list records marked "B." and "H." are given on the authority of Mr. J. B. Beckett, of Gorleston, Great Yarmouth, and Mr. F. W. Harmer, F.G.S., of Cringleford, Norwich, respectively. To these gentlemen my sincere thanks are due for allowing me to quote from their papers on this subject. There are also in Mr. Harmer's list some records which are the result of dredging operations made in 1870 by Captain Calver, of H.M.S. "*Porcupine*," in "Lynn Deepes." These were sent to Mr. Harmer by Mr. Gwyn Jeffreys, and are herein indicated by the initial "J."

LIST OF SPECIES.

AMPHINEURA.

- Craspedochilus onyx* (Spengl.) [= *Chiton cinereus*], Yarmouth (B.).
C. cinereus (L.) [= *C. marginatus*], common.

PELECYPODA.

- Nucula nucleus* (L.), common.
N. nitida G. B. Sow., rare (H.).
Nuculana minuta (Müll.), rare (H.).
Anomia ephippium L., common.
 v. *aculeata* Müll., The Wash (J.).
Barbatia lactea (L.), rare (H.).
Mytilus edulis L., common.
Modiolus modiolus (L.), common.
M. barbatus (L.), rare (H.).
Modiolaria marmorata (Forb.), The Wash (J.).
M. discors (L.), common.
M. discrepans (Leach), rare (H.).
Ostrea edulis L., common.

- Pecten varius* (L.), common.
 v. *nivea* Macgill, rare (H.).
P. opercularis (L.), rare.
Goodallia triangularis (Mont.), rare (H.).
Arctica islandica (L.), fragments, Holkham.
Loripes lacteus (L.), Yarmouth (B.).
Lucina borealis (L.), rare (H.).
Montacuta bidentata (Mont.), Yarmouth (B.).
Kellia suborbicularis (Mont.), The Wash (J.).
Syndosmyna nitida (Müll.), Yarmouth (B.).
S. alba (Wood), frequent.
Scrobicularia plana (daC.), plentiful.
Tellina donacina L., rare (H.).
T. tenuis (daC.), plentiful.
T. fabula Gronov., rare (H.).
T. pusilla Phil., The Wash (J.).
Macoma balthica (L.), common.

Donax vittatus (daC.), rare, Holkham.
Macra stultorum L., common.
Spisula solida (L.), Wells.
S. elliptica (Brown), rare (H.).
Dosinia exoleta (L.), rare (H.).
Venus ovata Penn., rare (H.).
V. gallina L., rare (H.).
Tapes virgineus (L.), rare (H.).
T. pullastra (Mont.), common.
Cardium exiguum Gm., common.
C. fasciatum Mont., rare (H.).
C. edule L., common.
C. norvegicum (Spengl.), rare (H.).
Psammobia tellinella Lmk., The Wash (J.).
P. depressa Penn., rare (H.).
Mya arenaria L., plentiful.
M. truncata L., plentiful.
Sphenia binghami Turt., The Wash (J.).
Corbula gibba (Oliv.), rare (H.).
Ensis ensis (L.), frequent (H.).
E. siliqua L., plentiful.
Solen vagina L., rare (H.).
Saxicava rugosa (L.), common.
S. arctica (L.), The Wash (J.).
Pholas dactylus L., Yarmouth (B.).
Barnea candida (L.), common.
Zirfaea crispata L., frequent (H.).
Teredo navalis L., common.

SCAPHOPODA.

Dentalium entalis L., fragments, Wells.

GASTROPODA.

Patella vulgata L., Yarmouth, not common.
Patina pellucida (L.), frequent in drift.
Acmaea virginea Müll., Yarmouth (B.).
Eumargarita helicina (Fabr.), rare (H.).
Gibbula magus (L.), rare, Heacham.
 v. conica Marshall, one specimen, Heacham.
G. tumida (Mont.), The Wash (J.).
G. cineraria (L.), common.
G. umbilicata (Mont.), common.
Calliostoma zizyphinus (L.), common.
Lacuna crassior (Mont.), frequent (H.).
L. divaricata (Fabr.), Yarmouth.
 v. gracilior Metcalfe, one specimen, Yarmouth.
L. pallidula (daC.), rare, in drift, Yarmouth.
Littorina obtusata (L.), common.
L. neritoides (L.), Breydon.
L. rudis (Maton), common.

L. littorea (L.), common.
Rissoa parva (daC.), common in drift.
 v. interrupta Adams, very plentiful
R. inconspicua Alder, Yarmouth (B.).
Zippora membranacea (J. Adams), The Wash (J.).
Onoba striata (J. Adams), not infrequent.
Cingula semistriata (Mont.), The Wash (J.).
Paludestrina stagnalis (Bast.), common.
Trivia europea (Mont.), not common, Cromer.
Natica catena (daC.), common.
N. alderi Forbes, common.
Velutina levigata (Penn.), rare (H.).
Bittium reticulatum (daC.), Yarmouth (B.).
Scala clathrus (L.), rare, Yarmouth.
Odostomia unidentata F. & H., Yarmouth (B.).
Brachyostomia rissoides (Hanl.), The Wash (J.).
Oda dolioliformis (Jeffr.), Yarmouth (B.).
Pyrgulina interstincta (Mont.), The Wash (J.).
Spiralinella spiralis (Mont.), The Wash (J.).
Eulima bilineata (Alder), The Wash (J.).
Aporrhais pes-pelecani (L.), one water-worn shell, Wells.
Buccinum undatum L., common.
 v. striata Penn (H.).
Neptunea antiqua L., common.
Tritonofusus gracilis (daC.), not infrequent.
Ocenebra erinacea (L.), common.
Trophon clathratus (L.), *v. truncata* (Ström.), The Wash (J.).
Purpura lapillus (L.), common.
 v. imbricata (Lmk.), (H.).
Nassa reticulata (L.), common.
 v. nitida Jeffr., common.
N. incrassata (Ström.), not uncommon.
Bela turricula (Mont.), not uncommon.
B. rufa (Mont.), not uncommon (H.).
Tornatina obtusa Mont., rare, Wells.
Diaphana hyalina (Turt.), The Wash (J.).
Leuconia bidentata (Mont.), rare (H.).
Alexia myosotis (Drap.), rare (H.).

CEPHALOPODA.

Sepia officinalis L., Yarmouth (B.).
Sepiola scandica Stp., (H.).
Polyopus vulgaris (Lmk.), Yarmouth (B.).

TAPES GEOGRAPHICUS AND T. PULLASTRA.

BY B. B. WOODWARD.

(Read before the Society, Jan. 9, 1901).

MR. J. T. Marshall in his note on this subject (*antea* p. 27) leaves much to be desired in the way of accuracy, both in his inferences and his references. The sentence "judging them only from a comparison of their shells" has no justification whatever in anything in my note; equally baseless is the assumption that "Mr. Woodward, on the other hand, has . . . apparently ignored the shells." Not being given to rush into print without adequate research and investigation, a careful study of the specimens in the Natural History Museum was made both before writing my previous note and in the present instance, and in each case in company with my friend and colleague, Mr. E. A. Smith, whose permission I have to state that he also considers the two forms to be distinct species. Further, when Mr. Marshall asserts I am mistaken in considering that Jeffreys was unaware of the occurrence of *T. pullastra* in the Mediterranean, he has manifestly overlooked in the very paper he quotes¹ Jeffreys' statement: "I have examined many hundred specimens of the southern form, *T. geographicus* from the Mediterranean and Adriatic; and my former opinion of its being the same species as the northern form, *T. pullastra*, has been most fully and satisfactorily confirmed." This clearly shows that Jeffreys was then unaware, or had forgotten, that the northern form occurred in the Mediterranean, side by side with the southern form; but, of course, holding as he did that the two forms were one species, he gives the range for that as quoted by Mr. Marshall. The further citation² is immaterial, since it only refers to Mr. Marshall's own echo of Jeffreys' opinion.

Now, as to the specific distinctness or not of these two forms opinions differ, but to Mr. Smith and myself it seemed that the differences were not merely "superficial" (the exact meaning of Mr. Marshall's sentence on this point is far from lucid). Not only is *T. geographicus* narrower and longer in form, even when compared with the most elongate forms of *T. pullastra* we could find (from Hunstanton, Norfolk; and from the Mediterranean) but it differs in other respects in its contour; whilst the hinge-plate is not so prominent, sloping back more into the valve, and the posterior portion of the hinge has a strong purplish tinge not observable in *T. pullastra*, which, on the other hand, has sometimes a purple stain *below* the

¹ *Proc. Zool. Soc.*, 1881, p. 717.

² *Journ. of Conch.*, vol. 8, p. 27, 1895.

hinge-line along the dorsal margin. Nor did we observe in the specimens before us any transition between the external markings of the two forms. In every case the two were most readily separable. Perhaps, however, Mr. Marshall has specimens which will throw further light on the subject; if so we trust he will kindly favour us with a sight of them.

There is some evidence to show that confusion has arisen from collectors, unfamiliar with the true *T. geographicus*, having distributed some varieties of *T. pullastra* as *T. geographicus*. Thus, in the British Museum there is a tablet (in a small collection presented by McAndrew) marked "*T. geographicus*, S. coast of Spain," bearing three specimens, each belonging to a different species, and in Jeffreys' handwriting in pencil; the right and left-hand specimens are respectively marked off as *T. virginea* and *T. pullastra*. Messrs. Sowerby and Fulton, too, have kindly shown us three sets of specimens, all received from one source, and all labelled "*T. geographicus*," of which one set alone was correctly named, the other two being manifestly varieties of *T. pullastra*.

Both Pfeiffer and Roemer, who, to put it mildly, were at least as good conchologists as Jeffreys, considered the two forms distinct, but identified *T. pullastra* with *T. senegalensis* Gmelin (Linn. Syst. Nat., ed. 13, p. 3, 282, no. 67), and were this determination upheld, those who contend for the identity of the two forms have no choice but to accept this name, since it occurs earlier in the work cited than that of *T. geographicus* by eleven pages! Adanson's figure and description, however, to which Gmelin refers, are far too meagre and unsatisfactory to render this identification certain (though Bucquoy, Dautzenberg, and Dollfus adopt the species as distinct, and give a figure which approaches that of Adanson¹) whereas there can be no doubt as to Montagu's *T. pullastra*.

Bucquoy, Dautzenberg, and Dollfus, on the other hand, consider *T. geographicus* to be a variety of *T. pullastra*, though they give no reason for it, and the two forms are instantly separable in their excellent plates; probably they simply follow Jeffreys.

Anyhow, as matters at present stand, the form *T. geographicus* appears so clearly marked off in its shape, coloration, and geographical distribution, as to be worthy to rank as specifically distinct from *T. pullastra*.

1 Moll. Marins Roussillon, vol. 2, pl. 42, fig. 2.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

295th Meeting, December 12th, 1900.

Mr. Thomas Rogers in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

Donation to the Cabinet announced and thanks voted :

By Mr. Whitwell : the new records mentioned in his paper.

Donation to the Fund for clearing off adverse balance announced and thanks voted :

Alexander Somerville, B.Sc., £2 2s.

New Member Elected.

William Henry Chadwick, 63, Hornsey Rise, London, N.

Candidates Proposed for Membership.

Miss Caroline Birley, Mrs. Edith Gould, Messrs. W. J. Edwards, J. W. Jackson, William Oelrichs, J. T. Wilde.

Resignations.

Rev. E. W. W. Bowell and T. W. Reader.

Names Struck Off.

The following names have been removed from the list of members in accordance with Rule 4 :—Messrs. J. B. Beckett, J. Clark, O. G. Evans-Thomas, and H. S. Wallace.

A Statement by the Committee

for collective investigation was presented (see p. 28).

The Report of the London Branch

was presented and read (see p. 42).

Papers Read.

"Norfolk Marine Mollusca," by Arthur Mayfield.

"Changes in Generic Names in the Pyramidellidae," by G. W. Chaster.

"*Tapes geographicus* and *T. pullastra*," by J. T. Marshall.

"Shells observed and collected in East Sussex, vice-county no. 14," by W. Whitwell.

Exhibits.

By Mr. E. Collier : *Succinea oblonga* from near Cork, and Roughy Bridge, Kenmare, and var. *arenaria* from Enniskillen and Carrickreagh, Lough Erne ; *Helix fusca* from Ingleton, Caldbeck near Keswick, Bassenthwaite, and Glencar, county Sligo ; *Helix rufescens*, cleaned out by insects, Carrickreagh ; *H. revelata* from the Lizard ; *H. nemoralis* vars. *citrinizonata* and *roseozonata*, Manorbier near Tenby ; var. *roseozonata* Bundoran ; and *H. hortensis* var. *lutea*, perfectly white before hibernation, and of the ordinary colour in the part subsequently added.

By Mr. F. Taylor : *Physa heterostrophia* from Hollinwood Canal.

By Mr. R. Standen : *Buccinum glaciale*, *B. angulosum*, and *B. scalariforme* from an icefloe, Spitzbergen ; a selection of shells from Somaliland, collected last year by Dr. Koettlitz ; and a fine set of *Amphidromus*, recently presented to the Manchester Museum ; and, on behalf of Mr. J. W. Whitwell, the set of shells collected by him at Horsted Keynes, and presented to the Cabinet.

296th Meeting, January 9th, 1901.

Mr. Thomas Rogers in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

New Members Elected.

Miss Caroline Birley, 14, Brunswick Gardens, Kensington, W.

Mrs. Edith Gould, 17, Dorchester Road, Weymouth, Dorset.

Mr. William J. Edwards, 96, Palmerston Street, Moss Side, Manchester.

Mr. John Wilfrid Jackson, 18, Bedford Avenue, Manley Park, Manchester.

Mr. William Oelrichs, F.R. Met. Soc., 3, Wexford Road, Oxton, Cheshire.

Mr. John Thomas Wilde, 76, Gladstone Road, Sparkbrook, Birmingham.

Candidates Proposed for Membership.

Messrs. R. H. Bentley, L. B. Brown, W. D. Brown, W. H. Edwards.

Resignations.

Rev. Addison Crofton, M.A., Mr. G. F. Tregelles.

Papers Read.

"*Tapes geographicus* and *T. pullastra*," by B. B. Woodward.

Exhibits.

By Mr. J. C. Melvill: *Bythoceras iridescens* Moore, and *Paramelania damoni*, from Lake Tanganyika.

A large series of British and foreign *Physæ* were exhibited by several members, and the Manchester Museum collections of *Physæ* and *Xenophore* were also shewn.

297th Meeting, February 13th, 1901.

Mr. Thomas Rogers in the chair.

Donations to the Library announced and thanks voted:

"Exotic Mollusca in California," by R. E. C. Stearns (*from the author*); and the usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted:

By Mr. F. Taylor: *Physa heterostropha* from Guidebridge, near Manchester.

New Members Elected.

Mr. Richard Herbert Bentley, 43, Gloucester Rd., Brownwood Park, London, N.

Mr. Lewis Boyer Brown, P.O. Box 148, Bridgetown, Barbados, West Indies.

Mr. W. D. Brown, Woodlands, Parbold, near Southport.

Mr. W. H. Edwards, Curator, Hastings Museum, Victoria Institute, Worcester.

Candidates Proposed for Membership.

Messrs. H. Beeston; W. O. Dyson; J. A. Rooth; and Rev. A. H. Cooke.

Papers Read.

"Dates of Publication of Forbes and Hanley's 'History of British Mollusca,'" by B. B. Woodward.

"The Marine Mollusca of the Isle of Man," by L. St. G. Byne and Alfred Leicester.

Exhibits.

By Mr. E. Collier: A number of sinistral and scalariform examples of *Helix nemoralis*, from the sand dunes between Blackpool and St. Anne's.

By Mr. W. Moss: *Helix vermiculata* Müll., with its "dart" and epiphragm; found living in a bag of Barcelona nuts.

By Mr. W. J. Edwards: A very beautiful variety of *Oliva tessellata* Lam.

By Mr. F. Taylor: *Littorina rudis* var. *sulcata*, from the Isle of Man; *Physa heterostropha*, from canal at Guidebridge; living specimens of the new *Paludetrina* (*P. taylори* Smith) from Dukinfield; and a fine series of North American, Trinidad, and British *Physæ*.

By Mr. R. Standen: A fine collection of *Magilus antiquus*, and allied species, recently presented to the Manchester Museum; also the Museum series of British Littorinidae.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

"Fauna Hawaïiensis: Mollusca." By E. R. SYKES, with intercalations on Anatomy by H. H. GODWIN-AUSTEN. Vol. 2, pp. 271-412, pl. 11, 12, Cambridge, 1900.

This work, dealing with the non-marine molluscs only, opens with a series of tables, illustrating the distribution of the fauna, and the following conclusions are drawn :—

- 1.—The molluscan fauna is nearly related to that of the Polynesian islands, and shows hardly any trace of continental influence, Asiatic or American.
- 2.—The species are nearly always confined to one island ; but it is very doubtful whether, as has been stated, "each valley has its peculiar species."
- 3.—When the genera found are confined to the islands, the majority of living species usually occur on Oahu.

Kauai has 50 species peculiar to it, Oahu 175, Molokai 44, Lanai 25, Maui 64, Hawaii 37.

A systematic account of the fauna is then given, and includes details of the anatomy of some Helicoid forms, due to Col. Godwin-Austen. The *Limacidae* number 7, *Zonitidae* 25, *Philomyxidae* 2, *Endodontidae* 24, *Helicidae* 2, *Pupidae* 10, *Achatinellidae* 332, *Tornatellinidae* 14, *Stenogyridae* 4, *Succineidae* 27, *Limnæidae* 13, *Melaniidae* 6, *Pahudestrinidae* 1, *Helicinidae* 5, *Neritidae* 5.

The Achatinellidae are divided into nine genera: *Achatinella* 107, *Perdicella* 8, *Newcombia* 9, *Amastra* 101, *Leptachatina* 76, *Thaanumia* 1, *Carelia* 9, *Auriculella* 20, and *Frickella* 1 ; some of these genera are also divided into sections.

The following new genera are described: *Godwinia*, with type *Vitrina caperata* Gld., and *Philonesia*, with type *Microcystis abeillei* Ancey. *Amastrella* is a new sub-genus of *Amastra* (type *A. rugulosa* Pease), and *Kauaia* a new name for *Carinella*, Pfr. nec Sby.

New species are described of *Perdicella*, *Leptachatina*, *Tornatellina*, *Achatinella*, *Auriculella*, and *Succinea* ; all these being figured, as also those described elsewhere by Mr. Sykes from the same collection.

The work concludes with a bibliography, list of forms treated as varieties or synonyms, and a further list of species unknown or erroneously recorded.

Monograph of the Land and Freshwater Mollusca of the British Isles, by J. W. TAYLOR ; part vii., completing vol. 1.

The seventh and concluding part of the introductory first volume of Mr. Taylor's great work was issued December 31, 1900. Dealing first with the conditions of geographical distribution of terrestrial mollusca, the author passes on to periodicity of species, giving well-known interesting examples. Coloured maps illustrate the approximate routes traversed by the Helicidae, etc., from their probable evolutionary centre and the world distribution of the chief Helicidian families. A very interesting comparison of the genital organs of the more or less highly developed Helicidian groups shows that the more elementary and ancient the types, the more widely are those types distributed. After defining the various geographical regions, the position of the British molluscan fauna is explained at length and illustrated by a coloured map. The geological history of the British Isles is next summarised, and a list of the fossils of each formation appended. The author then proceeds to give an interesting account of the enemies of mollusks and of their parasites. The various uses of mollusks, as food, medicine, ornament, money, and augury conclude the text. The part also contains a comprehensive index to the whole volume. The various plates add largely to the interest of the part.

Journal de Conchyliologie, vol. 48, nos. 2-4, 1900.

"Description d'une espèce nouvelle du genre *Cyrena* [*C. ingens*], provenant des Nouvelles Hébrides," by PH. DAUTZENBERG. "Diagnoses de Coquilles nouvelles de l'Indo-Chine," by A. BAVAY and PH. DAUTZENBERG [*Helix* 9, *Macrochlamys* 9, *Bulinus* 1, *Clausilia* 2, *Stenothyra* 1, *Cremnoconchus* 1, *Lithoglyphus* 1, *Melania* 1, *Alycaeus* 6 nn. spp.]. "Les Ammonites du calcaire rouge ammonitique (Toarcien) de l'Ombrie," by R. BELLINI.

"Coquilles marines du littoral du département d'Oran," by P. PALLARY [An elaborate paper, illustrated by 3 plates and cuts, several nn. spp. and varr.]. "Mollusques de l'Archipel de Bonin," by C. F. ANCEY [5 spp.]. "Diagnose d'une nouvelle espèce d'*Unio* [*U. fruhstorferi*] provenant de l'Indo-Chine," by PH. DAUTZENBERG.

"Description de coquilles nouvelles de l'Indo-Chine," by A. BAVAY and PH. DAUTZENBERG [Full description, with figs. of the spp. alluded to above]. "Rectifications de Nomenclature," by PH. DAUTZENBERG and H. FISCHER [*Bathysciadium conicum* = *Lepeta costulata*; *Clavator vayssieri* = *Cl. placostyloides* = *Bulinus grandidicri*.]

The Naturalist, nos. 525-530, Oct., 1900-Mar., 1901.

"*Vertigo angustior* in Lincolnshire," by J. W. TAYLOR. "*Acmæa testudinalis* in Grace Darling's collection," by W. DENISON ROEBUCK. "*Helix hortensis* and *H. nemoralis* at North Ormesby, Lincs.," by C. S. CARTER. "Molluscan Notes, Louth District," by C. S. CARTER [list of about twenty spp. and varr.]. "*Acmæa testudinalis* on the Yorkshire Coast," by J. BRAIM. "*Octopus* on the Cleveland Coast," by J. N. FAWCETT. "*Testacella scutulum* in Leeds City," by W. DENISON ROEBUCK. "*Helix virgata* in the Louth District," by C. S. CARTER. "Plague of Dew Slugs [*Agriolimax agrestis*] at Botsford," by M. PEACOCK. "Frost and *Limnea peregra*," by T. PETCH [alive under ice].

Science Gossip, vol. 7, nos. 77-82, Oct., 1900-Mar., 1901.

"On Colouring of Molluscs' Shells," by R. J. HUGHES [Original colour of fossils brought out by treatment with acid]. "Erosion of Shells," by A. E. BOYCOTT. "*Helix nemoralis* and *H. hortensis* in Yorkshire," by W. GYNGELL. "Colonies of Snails at High Altitudes" [Derbyshire, 1,250 feet], by [Rev.] R. A. BULLEN. "Land and Freshwater Mollusca of Hampshire," by LIONEL E. ADAMS and B. B. WOODWARD [list with revised nomenclature].

The Irish Naturalist, vol. 9, no. 11, Nov., 1900.

"Scalariform *Helix nemoralis* living at Bundoran," by W. A. GREEN.

La Feuille des Jeunes Naturalistes, nos. 362-365, Dec., 1900-Mar., 1901.

"Faunule malacologique des environs de Saint-Malo," by PH. DAUTZENBERG and P. DUROUCHOUX [183 spp. recorded]. "*Pupa* (*Lauria*) *umbilicata* Drp. et *Pupa* (*Pupilla*) *muscorum* Müll." [distinctive characters], by E. MARGIER. "Liste des coquilles marines, terrestres et d'eau douce recueillies aux environs de Cancale," by H. MARTEL [Supplement to list previously given; conclusion L. and F. W. Moll.]. "Le *Pupa* (*Torquilla*) *similis* Brug. (*P. cinerea* Drp.)," by E. MARGIER [geographical distribution].

The Annals of Scottish Natural History, no. 37, Jan., 1901.

"*Valvata piscinalis* and *Anodonta cygnea* in West Lothian," by R. GODFREY. "*Vertigo antivertigo* in West Lothian," by R. GODFREY.

The Chicago Academy of Sciences, Bulletin 3.

"The Mollusca of the Chicago Area: the Pelecypoda," by F. C. BAKER [Descriptive catalogue of 50 sp. with 27 pl.].

THE GEOLOGICAL DISTRIBUTION OF EXTINCT BRITISH NON-MARINE MOLLUSCA.

By R. BULLEN NEWTON, F.G.S.

(Read before the Society, Sept. 12th, 1900).

THE following work has been compiled in order to show at a glance the geological range of every recorded species of terrestrial and fluviatile shell, excluding those with M.S. names and any forms insufficiently described, from the strata of the British Islands, which are regarded as non-existent within the same limits.

Among such molluscs, *Archæonodon jukesii* appears to be the most ancient. It is related to the modern *Anodonta*, and belongs to the Devonian or Old Red Sandstone period, having been found in Ireland, Monmouthshire, and Northumberland. Next in point of age are a number of species peculiar to the Coal Measures, exhibiting unioniform affinities, which have been recognised by Wheelton Hind and others under the genera *Anthracomya*, *Carbonicola*, and *Naiadites*.

Land shells make their first appearance in rocks of Lower Lias age, forms having been described by Charles Moore as referable to the genera *Valvata*, *Vertigo*, *Despœna*, *Planorbis*, and *Helix*, which were discovered in the Charteris House Lead Mine, Mendip Hills, 270 feet from the surface.

More than sixty years ago William Bean described and figured *Unio distortus* from the Inferior Oolite beds of this country. This unique specimen, now in the possession of the British Museum, was found at Gristhorpe, Yorkshire.

Through the researches of Edward Forbes, Ralph Tate, and others, we have been made acquainted with an interesting assemblage of shells occurring in the Oolite (Infra-Oxfordian) rocks of Skye and Raasay in Scotland, containing such genera as *Leptoxis*, *Neritina*, *Paludestrina*, *Valvata*, *Viviparus*, *Corbicula*, and *Unio*. The Purbeck and Wealden strata have yielded a fauna of freshwater or estuarine character, among the mollusca being *Melania*, *Melanopsis*, *Physa*, *Unio*, etc.

In Tertiary times a large number of terrestrial and fluviatile shells flourished, nearly all of which belong to extinct species. One of the oldest forms from this group of rocks is *Camptoceras priscum*, a member of the family Physidæ, which was described by H. H. Godwin-Austen, in 1882, from the London Clay Deposits of Sheppey. During the succeeding Post-Tertiary period these mollusca were very abundant and mainly belonging to species which survived to modern times, only about twelve Gastropods being recognised as extinct besides three or four Lamellibranchs.

As there is no scope for synonymy in a list of this kind, it has been thought necessary to introduce the generic name under which a species was originally described, in addition of course to that which is now accepted; this is indicated by a rounded bracket.

The Bibliography which follows is intended to include only the principal papers and works which have been consulted during the preparation of the list.

Finally, the author tenders his acknowledgments to his colleagues at the British Museum, Mr. Edgar A. Smith, F.Z.S., and Mr. B. B. Woodward, F.G.S., for some useful suggestions made to him whilst collecting material for this work.

BIBLIOGRAPHY.

BAILY, W. H.—Explanations of 147 and 157 of the Maps of the Geological Survey of Ireland, 1861, p. 16 (woodcuts).

BEAN, W.—Description and figures of *Unio distortus* Bean and *Cypris concentrica* Bean from the Upper Sandstone and Shale of Scarborough. Loudon's *Mag. Nat. Hist.*, 1836, p. 376, woodcut 53.

BELL, R. G.—Land Shells in the Red Crag. *Geological Magazine*, 1884, p. 262.

COQUAND, H.—Description de quelques espèces nouvelles de coquilles fossiles découvertes dans la Chaîne du Jura. *Mem. Soc. Émul. Doubs* (Besançon), 1856, vol. 7, pp. 45–50, pl. 5.

DAWKINS, W. B.—On the range of *Anodonta jukesi*. *Trans. Manchester Geol. Soc.*, 1881, vol. 16, p. 247.

EDWARDS, F. E.—Monograph of the Eocene Mollusca. *Paleontographical Society*, 1852.

ETHERIDGE, R., JUNR.—The Palæozoic Conchology of Scotland. *Proc. Roy. Phys. Soc. Edinburgh*, 1882, pp. 49, 50, and 53.

FORBES, E.—On the Estuary Beds and the Oxford Clay at Loch Staffin in Skye. *Quart. Journ. Geol. Soc.*, 1851, vol. 7, pl. 5, pp. 109–113.

———.—On the Fossils of the Yellow Sandstone of the South of Ireland. *22nd Report Brit. Assoc.* for 1852, pub. 1853, p. 43.

GARDNER, J. S.—On the Land Mollusca of the Eocenes. *Geol. Mag.*, 1885, pl. 6, pp. 241–245.

HIND, W.—On three new species of Lamellibranchiata from the Carboniferous Rocks of Great Britain. *Quart. Journ. Geol. Soc.*, 1899, vol. 55, p. 365, pl. 25.

———.—A Monograph on *Carbonicola*, *Anthracomya*, and *Naia-dites*. *Paleontographical Society*, 1894, 1895.

———.—On the Affinities of *Anthracoptera* and *Anthracomya*. *Quart. Journ. Geol. Soc.*, 1893, vol. 49, pls. 7–10, pp. 249–275.

HOWSE, R.—Preliminary notice of the occurrence of *Archanodon* (*Anodonta*) *jukesi* Forbes in the Lower Carboniferous Rocks of North Northumberland. *Nat. Hist. Trans. Northumberland*, 1878, vol. 7, pl. 14, p. 173.

HUDLESTON, W. H.—British Jurassic Gasteropoda. *Palæontographical Society*, 1896, pl. 44, fig. 1, p. 488.

HUGHES, MRS. THOS. MCKENNY.—On the Mollusca of the Pleistocene Gravels in the Neighbourhood of Cambridge. *Geol. Mag.*, 1888, pp. 193-207.

———, Prof. THOS. MCKENNY.—On some Fossils supposed to have been found in the Pleistocene Gravels of Barnwell, near Cambridge. *Geol. Mag.*, 1883, pp. 454-456.

KENNARD, A. S., B. B. WOODWARD, and W. M. WEBB.—The Post-Pliocene Non-Marine Mollusca of Essex. *Essex Naturalist*, 1897, vol. 10, pp. 87-109.

KENNARD, A. S., and B. B. WOODWARD.—The Mollusca of the English Cave Deposits. *Proc. Malac. Soc. London*, 1897, vol. 2, pp. 242-244.

KENNARD, A. S., and B. B. WOODWARD.—A Revision of the Pliocene Non-Marine Mollusca of England. *Proc. Malac. Soc. London*, 1899, vol. 3, pp. 187-204.

LORIOI, P. DE.—Étude Géologique et Paléontologique de la formation d'eau douce infracrétacée du Jura et en particulier de Villers-le-Lac, part 2, Description des Fossiles. *Mém. Soc. Phys. Hist. Nat. Genève*, 1865, vol. 18, 1st part, pp. 82-106, pl. 2, 3.

LYELL, C.—The Students' Elements of Geology, 1874, 2nd edition, p. 311.

MANTELL, G.—The Geology of the South-East of England, 1833.

MOORE, C.—On Abnormal Conditions of Secondary Deposits when connected with the Somersetshire and South Wales Coal Basin. *Quart. Journ. Geol. Soc.*, 1867, vol. 23, pls. 14-17, pp. 545-557.

MORRIS, JOHN.—A Catalogue of British Fossils, 2nd edition, 1854.

NEWTON, R. BULLEN.—Systematic List of the Frederick E. Edwards' Collection of British Oligocene and Eocene Mollusca in the British Museum (Natural History), London, 8vo., 1891.

———.—On *Archanodon jukesi* (Forbes MS.) Bailey sp. from the Old Red Sandstone of Monmouthshire. *Geological Magazine*, 1899, pp. 245-251, with plate.

NEWTON, R. B., and G. F. HARRIS.—Descriptions of some new or little-known shells of Pulmonate Mollusca from the Oligocene and Eocene Formations of England. *Proc. Malac. Soc. London*, 1894, vol. 1, pl. 6, pp. 70-77.

PHILLIPS, JOHN.—Illustrations of the Geology of Yorkshire. Part 1, ed. 3 (R. Etheridge), 1875, p. 251.

REID, C.—The Pliocene Deposits of Britain. *Mem. Geol. Survey United Kingdom*, 1890.

SANDBERGER, C. L. F.—Die Land-und Süsswasser-Conchylien der Vorwelt, 1870–1875.

———.—Ein Beitrag zur Kenntniss der Unterpleistocänen Schichten Englands. *Palæontographica*, 1880, pp. 83–104, pl. 12.

SOWERBY, J. and J. DE C.—The Mineral Conchology of Great Britain. 7 vols., 1812–1846.

SOWERBY, J. DE C.—Notes respecting the Shells [found in the Purbeck and Wealden Strata]. *Trans. Geol. Soc. London*, 1837, ser. 2, vol. 4, part 2, pls. 21 and 22, pp. 176–179; 259, 260; and 344–347.

STOPES, H.—Pleistocene Man in the Thames Gravels. *Athenæum*, no. 3795, July 21st, 1900, p. 93. Gives List of Mollusca by A. S. KENNARD.

TATE, R., and J. F. BLAKE.—The Yorkshire Lias, 1876.

WOOD, S. V.—A Monograph of the Crag Mollusca. *Palæontographical Soc.*, 1848, 1850, and *Supplement*, 1872.

———.—A Monograph of the Eocene Mollusca. *Palæontographical Soc.*, 1877.

WOODWARD, B. B.—Note on the Pleistocene Land and Freshwater Mollusca from the Barnwell Gravels. *Proc. Geologists' Assoc.*, 1888, vol. 10, pp. 355–360.

———.—On the Pleistocene (Non-Marine) Mollusca of the London District. *Proc. Geol. Assoc.*, 1890, vol. xi., pp. 335–388.

WOODWARD, H. B.—The Jurassic Rocks of Britain, vol. 5, the Middle and Upper Oolitic Rocks of England (Yorkshire excepted). *Mem. Geol. Survey United Kingdom*, 1895.



| | Post-Tertiary | Tertiary | Mesozoic or Secondary | Palaeozoic or Primary | |
|--|---------------|-----------------|-----------------------|-----------------------|-------------------------------|
| | Post-Pliocene | Pliocene (Crag) | Oligocene | Eocene | Cretaceous (Wealden) |
| | | | | | Oolite (Purbeck Beds) |
| | | | | | Oolite (Infr.-Oxfordian) |
| | | | | | Oolite (Infr.-Oolite) |
| | | | | | Lias |
| | | | | | Trias |
| | | | | | Permian |
| | | | | | Carboniferous (Coal Measures) |
| | | | | | Devonian or Old Red Sandstone |
| | | | | | Silurian |
| | | | | | Ordovician |
| | | | | | Cambrian |
| Acroloxus (Ancylus) elegans <i>J. de C. Sowerby</i> | ... | ... | ... | ... | ... |
| Amphidromus (Bulimus) ellipticus <i>J. Sowerby</i> | ... | ... | ... | ... | ... |
| Amphidromus (Bulimus) lævolongus <i>Bouček</i> | ... | ... | ... | ... | ... |
| Amphidromus (Pupa) Rillyensis (?) <i>Boissy</i> ... | ... | ... | ... | ... | ... |
| Amphidromus (Bulimus) tenuistriatus <i>G. B. Sowerby</i> ... | ... | ... | ... | ... | ... |
| Ancylus (?) latus <i>F. E. Edwards</i> ... | ... | ... | ... | ... | ... |
| Assimineæ (Paludina) conica <i>C. Prévost</i> | ... | ... | ... | ... | ... |
| Bithynia ovatula <i>Sandberger</i> | ... | ... | ... | ... | ... |
| Bithynella (Bithynia) pulchra <i>Deshayes</i> var. | ... | ... | ... | ... | ... |
| Bithynella (Hydrobia) Websteri <i>Morris</i> | ... | ... | ... | ... | ... |
| Bithynella (Hydrobia) Steenii <i>E. v. Martens</i> | ... | ... | ... | ... | ... |
| Callianella (Callia) lævis <i>Sandberger</i> | ... | ... | ... | ... | ... |
| Camptoceras priscum <i>Godwin-Austen</i> | ... | ... | ... | ... | ... |
| Clausilia pliocena <i>S. V. Wood</i> | ... | ... | ... | ... | ... |
| Clausilia pumila <i>Ziegler</i> ... | ... | ... | ... | ... | ... |
| Clausilia striatula <i>F. E. Edwards</i> | ... | ... | ... | ... | ... |
| Cochlicopa headonensis <i>R. B. Newton and G. F. Harris</i> | ... | ... | ... | ... | ... |
| Coptostylus (Melanopsis) brevis <i>J. de C. Sowerby</i> | ... | ... | ... | ... | ... |
| Craspedopoma Elizabethæ <i>F. E. Edwards</i> | ... | ... | ... | ... | ... |
| Cyclotus cinctus <i>F. E. Edwards</i> | ... | ... | ... | ... | ... |
| Cyclotus nudus <i>F. E. Edwards</i> | ... | ... | ... | ... | ... |

GASTROPODA.

[illegible]

| | Post-Tertiary | | | Mesozoic or Secondary | | | | | Palaeozoic or Primary | | | | | | | |
|---|---------------|-----------------|-----------|-----------------------|----------------------|-----------------------|--------------------------|--------------------------|-----------------------|-------|---------|-------------------------------|-------------------------------|----------|------------|----------|
| | Post-Pliocene | Pliocene (Crag) | Oligocene | Eocene | Cretaceous (Wealden) | Golite (Purbeck Beds) | Golite (Intra-Oxfordian) | Golite (Inferior Golite) | Lias | Trias | Permian | Carboniferous (Coal Measures) | Devonian or Old Red Sandstone | Silurian | Ordovician | Cambrian |
| GASTROPODA. | | | | | | | | | | | | | | | | |
| <i>Limnæa caudata F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa cincta F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa columellaris J. de C. Sowerby</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa convexa F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa costellata F. E. Edwards</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa (Limnæus) fabula Brongniart</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa (Limnæus) fusiformis J. Sowerby</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa gibbosula F. E. Edwards</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa headonensis R. B. Newton and G. F. Harris</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa (Limnæus) longiscata Brongniart</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa (Limnæus) minima J. Sowerby</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa mixta F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa (Limnæus) ovum (?) Brongniart</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa (Lymnæe) pyramidalis Brongniart</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa recta F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa sublata F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa subquadrata F. E. Edwards</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa sulcata F. E. Edwards</i> | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa tenuis F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Limnæa tumida F. E. Edwards</i> ... | ... | | × | | | | | | | | | | | | | |
| <i>Megaspira cylindrica R. B. Newton and G. F. Harris</i> | ... | | × | | | | | | | | | | | | | |
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|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| <i>Megaspira monodonta</i> R. B. Newton and G. F. Harris | | | | | | | | | | | | | | | | |
| <i>Melampus fusiformis</i> S. V. Wood | | | | | | | | | | | | | | | | |
| <i>Melampus (Auricula) pyramidalis</i> J. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melampus tridentatus</i> F. E. Edwards | | | | | | | | | | | | | | | | |
| <i>Melanatria (Cerithium) castellini Brongniart</i> var. | | | | | | | | | | | | | | | | |
| <i>Melanatria (Melania) inquinata DeFrance</i> | | | | | | | | | | | | | | | | |
| <i>Melania (Potamides) acuta</i> J. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melania heysseana Philippi</i> | | | | | | | | | | | | | | | | |
| <i>Melania (?) inermis</i> R. Tate | | | | | | | | | | | | | | | | |
| <i>Melania nysti</i> (Duchastel MS.) Nyst | | | | | | | | | | | | | | | | |
| <i>Melania (Tornatella) popei</i> J. de C. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melanopsis (?) attenuata</i> J. de C. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melanopsis buccinoidea Ferussac</i> | | | | | | | | | | | | | | | | |
| <i>Melanopsis buccinulum (?) Deshayes</i> | | | | | | | | | | | | | | | | |
| <i>Melanopsis carinata</i> J. de C. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melanopsis fusiformis</i> J. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melanopsis harpæformis Dunker</i> | | | | | | | | | | | | | | | | |
| <i>Melanopsis popei</i> J. de C. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melanopsis pseudo-subulata</i> R. B. Newton | | | | | | | | | | | | | | | | |
| <i>Melanopsis rugosa Dunker</i> | | | | | | | | | | | | | | | | |
| <i>Melanopsis sodalis Deshayes</i> | | | | | | | | | | | | | | | | |
| <i>Melanopsis subcarinata Morris</i> | | | | | | | | | | | | | | | | |
| <i>Melanopsis subulata</i> J. Sowerby | | | | | | | | | | | | | | | | |
| <i>Melanopsis tricarinata</i> J. de C. Sowerby | | | | | | | | | | | | | | | | |
| <i>Nematurella runtoniana Sandberger</i> | | | | | | | | | | | | | | | | |
| <i>Neritina (Nerita) aperta</i> J. de C. Sowerby | | | | | | | | | | | | | | | | |
| <i>Neritina arata</i> R. Tate | | | | | | | | | | | | | | | | |

| | Post-Tertiary | | | Tertiary | | | Mesozoic or Secondary | | | | | Palaeozoic or Primary | | | | | |
|--|---------------|-----------------|-----------|----------|-----------------------|-----------------------|--------------------------|--------------------------|------|-------|---------|-------------------------------|-------------------------------|----------|------------|----------|--|
| | Post-Pliocene | Pliocene (Crag) | Oligocene | Eocene | (Cretaceous (Wealden) | Oolite (Furbeck Beds) | Oolite (Infra-Oxfordian) | Oolite (Inferior Oolite) | Lias | Trias | Permian | Carboniferous (Coal Measures) | Devonian or Old Red Sandstone | Silurian | Ordovician | Cambrian | |
| GASTROPODA. | | | | | | | | | | | | | | | | | |
| <i>Neritina arenacea Terquem</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina canalis Terquem</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina concava J. de C. Sowerby</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina forbesi S. V. Wood</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina fulminifera (?) Sandberger</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina (Nerita) globulus Ferrussac</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina fittoni Mantell</i> .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina hettangensis Terquem</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina passyana (?) Deshayes</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina planulata Sandberger</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina staffinensis Forbes</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina tristis Forbes</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Neritina vicina Melleville</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Hydrobia) caledonica R. Tate</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Hydrobia) precursor Sandberger</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Paludina) Dubuissoni (?) Bouillet</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Bulimus) inflata Faujas St. Fond</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Paludina) marginata Michaud...</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Littorinella) obtusa Sandberger</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina reevei Kennard and B. B. Woodward</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |
| <i>Paludestrina (Hydrobia) solidula Dunker</i> ... | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | |

| | Post-Tertiary | Tertiary | Mesozoic or Secondary | Palaeozoic or Primary | | | | | | | | | | | | | | |
|---|---------------|----------|-----------------------|-----------------------|-----------------|-----------|--------|----------------------|-----------------------|--------------------------|-------------------------|------|-------|---------|-------------------------------|-------------------------------|----------|------------|
| | | | | Post-Pliocene | Pliocene (Crag) | Oligocene | Eocene | Cretaceous (Wealden) | Oolite (Purbeck Beds) | Oolite (Intra-Oxfordian) | Oolite (Lutifer Oolite) | Lias | Trias | Permian | Carboniferous (Coal Measures) | Devonian or Old Red Sandstone | Silurian | Ordovician |
| GASTROPODA. | | | | | | | | | | | | | | | | | | |
| <i>Pyramidula</i> (<i>Helix</i>) <i>suttonensis</i> S. V. Wood... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Pyrgula</i> (<i>Sellia</i>) <i>pulchra</i> Raincourt... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Stenothyra</i> (<i>Litorinella</i>) <i>lubricella</i> Braun | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Stenothyra</i> (<i>Bithinia</i>) <i>mediana</i> Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Stenothyra</i> (<i>Hydrobia</i>) <i>parkinsoni</i> Morris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Stenothyra</i> (<i>Nematura</i>) <i>parvula</i> Morris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Stenothyra</i> (<i>Paludina</i>) <i>pupa</i> Nyst ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Succinea</i> <i>imperspicua</i> F. E. Edwards | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Succinea</i> <i>sparnacensis</i> (?) Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Tomichia</i> (<i>Cyclostoma</i>) <i>duchasteli</i> Nyst | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Tomichia</i> (<i>Cyclostoma</i>) <i>microstoma</i> Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Tomichia</i> (<i>Bulimus</i>) <i>polita</i> F. E. Edwards | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Tomichia</i> (<i>Bithinia</i>) <i>tuba</i> Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>anomala</i> C. Moore | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>comes</i> Hudleston | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>contorta</i> Menke ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>helicooides</i> Forbes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>fluvialis</i> Colbeau | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>præcursor</i> R. Tate | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Valvata</i> <i>pygmæa</i> C. Moore | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Vertigo</i> <i>murchisonæ</i> C. Moore | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

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LAMELLIBRANCHIATA (PELECYPODA).

| | | |
|--|----------------------------|-----|
| Anodonta purbeckensis (Forbes MS.) | <i>Morris</i> | ... |
| Anthracomya adamsi | <i>Salter</i> | ... |
| Anthracomya adamsi var. expansa | <i>IV. Hind</i> | ... |
| Anthracomya angusta | <i>IV. Hind</i> | ... |
| Anthracomya calcifera | <i>IV. Hind</i> | ... |
| Anthracomya carinata | <i>IV. Hind</i> | ... |
| Anthracomya (Unio) dolabrata | <i>J. de C. Sowerby</i> | ... |
| Anthracomya (Naiadites) levis var. scotica | <i>R. Etheridge, Junr.</i> | ... |
| Anthracomya lanceolata | <i>IV. Hind</i> | ... |
| Anthracomya (Anodonta) minima | <i>Ludwig</i> | ... |

| LAMELLIBRANCHIATA (PELECYPODA). | | | | | | | | | | | | | | | | |
|--|----------|-----------------------|------------------------|-----------------|-----------|--------|----------------------|-----------------------|--------------------------|--------------------------|-------|---------|-------------------------------|-------------------------------|----------|----------|
| Post-Tertiary | Tertiary | Mesozoic or Secondary | Palaeozoic or Cambrian | | | | | | | | | | | | | |
| | | | Post-Pliocene | Pliocene (Crag) | Oligocene | Eocene | Cretaceous (Wealden) | Oolite (Purbeck Beds) | Oolite (Infra Oxfordian) | Oolite (Inferior-Oolite) | Trias | Permian | Carboniferous (Coal Measures) | Devonian or Old Red Sandstone | Silurian | Cambrian |
| | | | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya minima var. carinata <i>W. Hind</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya (Unio) modiolaris <i>J. de C. Sowerby</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya obovata <i>W. Hind</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya (Unio) obtusa <i>Ludwig</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya (Unio) phillipsi <i>Williamson</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya pulchra <i>W. Hind</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya pumila <i>Salter</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya senex <i>Salter</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya subcentralis <i>Salter</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya (Modiola) subparallelata <i>Portlock</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya valenciensis <i>W. Hind</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya wardi (Salter MS.) <i>R. Etheridge</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya (Modiola) williamsoni <i>Brown</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Anthracomya williamsoni var. (Unio) obtusa <i>Ludwig</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Archaeonodon (Anodon) jukesi (Forbes MS.) <i>Baily</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Carbonicola (Cardinia) angulata <i>Ryckholt</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Carbonicola antiqua <i>W. Hind</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Carbonicola (Unio) acuta <i>J. Sowerby</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Carbonicola acuta var. rhomboidalis <i>W. Hind</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Carbonicola (Unio) aquilina <i>J. de C. Sowerby</i> | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Carbonicola cuneiformis <i>W. Hind</i> ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

LAMELLIBRANCHIATA (PELECYPODA).

| LAMELLIBRANCHIATA (PELECYPODA). | | | | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | | | | | | | | | | | | | | |
| Corbicula (Cyrena) cunninghami Forbes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) cycladiformis Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyclas) deperdita Lamarck | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) dulwichensis Rickman | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) elongata J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Tellina) fluminalis Müller | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) forbesi Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena?) gibbosa J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) gibbosula Morris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) intermedia (?) Melleville | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) jamesoni Forbes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) inaccullochi Forbes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) major J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) media J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) membranacea J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) obliqua (?) Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyclas) obovata J. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) obtusa Morris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena) pisum (?) Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyclas) pulchra J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Corbicula (Cyrena?) pullastra S. V. Wood | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
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| | Post-Tertiary | | | Mesozoic or Secondary | | | | | Palaeozoic or Primary | | | | |
|--|-----------------|-----------|--------|-----------------------|-----------------------|--------------------------|--------------------------|------|-----------------------|---------|-------------------------------|-------------------------------|------------|
| | Pliocene (Crag) | Oligocene | Eocene | Cretaceous (Wealden) | Oolite (Purbeck Beds) | Oolite (Infra-Oxfordian) | Oolite (Interior-Oolite) | Lias | Trias | Permian | Carboniferous (Coal Measures) | Devonian or Old Red Sandstone | Silurian |
| | Post-Pliocene | | | | | | | | | | | | Ordovician |
| <i>Unio edwardsi</i> S. V. Wood | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio gaulteri</i> J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio gibbsi</i> Morris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio littoralis</i> Lamarck | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio mantelli</i> J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio martini</i> J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio michaudi</i> (?) Deshayes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio porrectus</i> J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio solandri</i> J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio</i> (?) <i>staffinensis</i> Forbes | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio subparallelus</i> S. V. Wood | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio subtruncatus</i> J. de C. Sowerby | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio tumescens</i> S. V. Wood | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio valdensis</i> Mantell | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| <i>Unio vectensis</i> S. V. Wood | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |

In accordance with Sandberger's views of 1880, the Norfolk forest-bed species scheduled in these tables are regarded as of Post-Pliocene Age.

Much of the information contained in these lists, although differently arranged, has already appeared in Mr. J. W. Taylor's "Monograph of the Land and Freshwater Mollusca of the British Isles" (part vii., pp. 405-415, issued December 31st, 1900), the manuscript of this paper having been in the possession of Mr. Taylor almost continuously since August of 1894, for intended incorporation in the work quoted, until it was returned to me at my request in August, 1900, for publication in the *Journal of Conchology*. This fact must account for considerable delay in its publication.

THE MARINE MOLLUSCA AND BRACHIOPODA OF THE ISLE OF MAN.

BY L. ST. G. BYNE, M.Sc., AND ALFRED LEICESTER.

(Read before the Society, February 13th, 1901).

It has for some time occurred to us that a List of the Marine Mollusca of the Isle of Man would be useful to workers, and we here offer one as complete as we have been able to make it. It may happen that a few species have been inadvertently omitted, but many trifling varieties have been purposely discarded.

The Isle of Man, especially the area around the Calf, provides a most excellent field for molluscan work. Several rare species, e.g., *Pecten incomparabilis* (*P. testæ*), *Cardium minimum*, *Propilidium ancylöide*, etc., may be obtained by dredging off Port Erin, where there is a Biological Station under the direction of the Liverpool Marine Biology Committee.¹

Good shore collecting is obtained at Port Erin, Port St. Mary, and Fleshwick Bays, whilst dredging is most productive around the Calf and off Port Erin, Bay Fine, Fleshwick, Contrary Head, and Spanish Head. The *Melobesia* ground off St. Ann's Head is quite unproductive of mollusca.

We have included several species not found by us up to the present on the authority of previous writers on whom rests the responsibility for the correctness of the occurrence and identification. Such are *Tellina tenuis*, *Paludestrina stagnalis*, (*Hydrobia ulvæ*), *Neptunea antiqua*, (*Fusus antiquus*) var. *striata*, *Clathurella* (*Defrancia*) *leufroyi*, and *Otina otis*.

Yearly Reports upon the Marine Mollusca of the Island have been compiled by one of us (A.L.), and have appeared in the Annual Reports of the L.M.B.C., and in addition we have extracted information from the following published works:—

FORBES, E. *Malacologia monensis*, Edinburgh, 1838.

DARBISHIRE, R. D. *The Testaceous Mollusca, Report upon the Fauna of Liverpool Bay*, vol. 1, p. 232–266, 1886.

HERDMAN, W. A. *Notes on the Marine Invertebrate Fauna of the Southern End of the Isle of Man*, *Tom cit.*, p. 318–341 [Mollusca, p. 337–339].

ARCHER, F. *Supplementary Report upon the Testaceous Mollusca of the L.M.B.C. District*, *Op. cit.*, vol. 3, p. 59–75, 1892.

¹ We desire here to record our indebtedness to the facilities given by this Institution and to call the attention of other naturalists to them. Full particulars may be seen in the Reports of the L.M.B.C. or may be obtained either from Professor Herdman or from the Curator of the Station.

HERDMAN, W. A. and others. The Marine Zoology, Botany and Geology of the Irish Sea. *Rep. Brit. Assoc.*, Liverpool, 1896, p. 417-450 [Mollusca, p. 442-447], and *Rep. Fauna Liverpool Bay*, vol. 5, Appendix.

In order to render this list available for use by those who adopt the "Revised List of British Mollusca," recently issued by the Society, as well as by those who still adhere to Jeffreys' nomenclature, we have in those cases where they differ given both names side by side. Some of the generic names in the new list are, however, used only as subgenera, and the subgeneric terms of the new list are in most cases omitted.

We desire to offer our best thanks to Professor W. A. Herdman for having looked through the manuscript of this list.

We shall be pleased to receive additions or corrections.

THE MOUNT,

ASTON CLINTON, BUCKS.

BRACHIOPODA.

Terebratulina caput serpentis (L.) (**Terebratula**). — A small dead example dredged off Bay Fine. Has never been recorded living.

Crania anomala (Müll.).—Living. Attached to old shells and stones, dredged three miles west of Fleshwick, also six miles west of Port Erin.

MOLLUSCA.

Chiton (Acanthochites) fascicularis L.

C. (Lepidopleurus) cancellatus G. B. Sow.

C. (Craspedochilus) onyx Spengl. (**cinereus**).

C. (C.) albus L.

C. (C.) cinereus L. (**marginatus**).

C. (Tonicella) ruber Lowe.

C. (Callochiton) lævis Mont. Port Erin. Of these species enumerated we have never seen *C. cancellatus* and *C. albus*. Their occurrence is recorded in *Fauna Liverpool Bay*, vol. 1, p. 338.

Nucula sulcata Bronn.—Dredged in 79 fathoms, fourteen miles north-west of Port Erin, in very tenacious mud. The double shells were dead and extremely brittle.

N. nucleus L.

v. **radiata** F. & H.—Plentiful.

N. nitida G. B. Sow.—Occasionally, Port Erin.

Nuculana minuta (Müll.) (**Leda**).

Anomia ehippium L.

v. **squamula** L.

v. **aculeata** Müll.

v. **cylindrica** Gmel.

A. patelliformis L.

Glycymeris glycymeris (L.) (**Pectunculus**).—Beautiful examples dredged, abundantly and well distributed.

Arca tetragona Poli.—Small examples dredged dead. Forbes (Mal. Mon., p. 42), says: "I dredged two living specimens of this fine species in twenty fathoms of water, off the coast of Ballaugh, in September, 1835. They were found imbedded in the mud filling the cavities of dead *Modiolæ*." Dr. Turton first noticed this species as British; the locality he gives is "the Calves, west of Ireland" (Brit. Bivalves, p. 169, t. 13, fig. 1).

A. (Barbatia) lactea L.

Mytilus edulis L.—Small only.

v. **incurvata** Penn.—In rock crevices, Port Erin.

v. **pellucida** Penn.—Occasionally.

Modiolus modiolus L. (**Mytilus**).—Very large. Common between Port Erin and the Calf.

M. phaseolinus (Phil.).

Modiolaria marmorata Forbes.

M. discors L.**Ostrea edulis** L.

Pecten maximus L.—Common and very large. Distributed everywhere.

P. pusio L.—Dredged frequently, attached to old shells.

P. varius L.—Dredged off the Calf, Port Erin, and Spanish Head.

P. opercularis L.—Very abundant and of large size, usually of a reddish-pink colour.

P. tigrinus (Müll.).—Fine and good specimens, well distributed, but not common.

v. **costata** Jeffr.—Good examples in fair proportion, with the type.

P. incomparabilis Risso (**P. testæ** Biv.).—About fifty specimens of this rare species have been dredged in the southern area. Also many valves.

P. striatus (Müll.).—Off Fleshwick. Scarce.

P. similis (Lask.).—Off Spanish Head, Bay Fine, and Port Erin.

Lima elliptica Jeffr.—Dredged in 24 fathoms six miles off Port Erin.

L. subauriculata (Mont.).—Alive, north of island (Darbishire).

L. loscombii G. B. Sow.—Occasionally. Off Spanish Head.

L. hians (Gmel.).—Rare. North of island (Darbishire), also six miles off Port Erin. The species of *Lima* are of rare occurrence.

Turtonia minuta (Fabr.) (**Cyamium**).—Fleshwick Bay.

Astarte sulcata (DaC.).

v. **scotica** Mat. & Rack.—Deep water on the north coast. Rare. (Forbes).

v. **elliptica** Brown.

Goodallia triangularis (Mont.). (**Astarte**).

Isocardia humana L. (**cor**).—Trawled off the Calf.

Arctica islandica (L.) (**Cyprina**).

Lucina spinifera Mont.—Several dead off Bay Fine (Archer).

L. borealis (L.).—Dead shells and valves common off Port Erin (Archer). Valves cast up on the beach in winter (Chadwick).

Cryptodon flexuosus (Mont.) (**Axinus**).—Valves.

Montacuta substriata (Mont.).—Occasionally on north of island and off Port Erin.

M. bidentata (Mont.).—Fairly plentiful off Port Erin.

Tellimya ferruginosa (Mont.) (**Montacuta**).—A fine example in the tuft of spines projecting from the posterior end of *Echinocardium cordatum* (Chadwick).

Kellia suborbicularis (Mont.).—Very fine.

Lasæa rubra (Mont.).—A few dead shells on the north of island until July, 1900, when it was found in quantity on rocks at high-water mark at Port Erin inside the empty cases of *Balanus*. This habitat is given by Jeffreys. Each *Balanus* contained on an average four shells and several had eight.

Lepton squamosum (Mont.).—Valves only.

L. nitidum Turt.—Several dredged.

L. sulcatulum Jeffr.—Dredged off Kitterland.

L. clarkiae Cl.

Syndosmya prismatica (Mont.) (**Scrobicularia**).—Living, Port Erin.

S. nitida (Müll.).

S. alba (Wood).

Tellina crassa (Gmel.).

T. tenuis DaC.—Douglas, rare. Frequent at Ramsey (Forbes).

T. fabula (Gronov.).—Beach, Port Erin.

T. donacina L.—Valves.

T. pusilla (Phil.).—Dredged, Port Erin.

Macoma balthica (L.) (**Tellina**).—Douglas, Ramsey, and Derbyhaven (Forbes).

Donax vittatus (DaC.).

Mactra stultorum L.

M. (Spirula) solida L.

v. **elliptica** Brown.—Dredged off Port Erin.

Lutraria elliptica Lmk.—A fine living, and two dead but perfectly fresh shells, at half-tide on Port Erin beach. Their discovery was due to the bursting of the old town sewer, which caused them to

be washed out of the mud in which they lived. A fresh valve dredged off Bay Fine, 1st Sept., 1900.

Lucinopsis undata (Penn.).—Good shells.

Venus fasciata DaC.

V. casina L.—Fine examples, well distributed, several with a very thick outer lip.

V. ovata Penn.

V. gallina L.—Beach, Port Erin and Ramsey.

V. (Dosinia) exoleta L.—Fine dredged.

V. lupina L. (**lincta**).—Fine dredged.

Tapes virgineus (L.).

T. pullastra Mont.

Gouldia minima (Mont.). (**Circe**).—Valves occasionally.

Cardium echinatum L.—Very fine, dredged.

C. fasciatum Mont.

C. nodosum Turt.

C. edule L.

C. minimum Phil.—One large and several small examples dredged off the south coasts of island.

C. norvegicum Spengl.

Psammobia tellinella Lmk.—Beautifully coloured and fine shells dredged.

P. ferrøensis (Chem.).—Port Erin Bay.

P. depressa Penn. (**vespertina**).—Very small, Port Erin.

Mya truncata L.—Dead valves are not uncommon on the north coast (Forbes). A fine dead example dredged off Bay Fine.

M. (Sphenia) binghami Turt.—One fine example dredged alive.

Corbula gibba (Oliv.).

Solecurtus antiquatus (Pult.).—Two double shells and several valves, all poor, dredged one mile off the Calf.

Solen (Cultellus) pellucidus (Penn.).—Dredged between Bay Fine and Bradda Head.

S. (Esis) ensis L.

S. (E.) siliqua L.—Very fine.

Saxicava rugosa (L.).

v. **arctica** L.

v. **pholadis** L.—In cavities of limestone and old shells (Forbes, Mal. Mon., p. 56).

Pholas (Zirfæa) crispata L.—In the projecting masses of hard clay, Bay-ny-Carrikey (Herdman).

Pandora inæquivalvis (L.).—Dredged off Fleshwick.

v. **pinna** Mont. (**obtusa** Jeffr.).—Dredged between Bay Fine and Bradda Head.

Lyonsia norvegica (Chem.).—Dredged living off Port Erin.

Cochlodesma prætenue (Pult.) (**Thracia**).—Dredged alive, Port Erin (Darbishire).

T. fragilis Penn. (**papyracea** Poli).—A small example dredged off Bradda Head.

T. distorta (Mont.).—One dredged.

Pulsellum lofotense Sars (**Siphonodentalium**).—Dr. Chaster records (*J. Conch.*, vol. 8, p. 11) the occurrence of six living examples in mud, trawled about five miles north-west of Peel (60 fathoms).

Dentalium entalis L.—Extremely fine living specimens dredged off Port Erin and Spanish Head (20 fathoms).

D. vulgare da Costa (**tarentinum**).—Dead only.

Patella vulgata L.—Very fine around Spanish Head and at the Sound. Many are egg-shaped in outline.

v. **elevata** Jeffr.—Plentiful at Port St. Mary, on the rocks on each side of the esplanade.

v. **picta** Jeffr.—Abundant at Port Erin.

v. **cærulea** L.—Very scarce. Beautiful specimens under rocks at the Sound.

Dr. Jeffreys (B.C., vol. 3, p. 240) quotes Canon Norman's remarks (*Zoologist*, Oct., 1860):—"It will be found to be a general rule with regard to the limpet, that the nearer high-water mark the shell is taken, the higher spired, more strongly ribbed, and smaller it will be; and that the lower down it lives the flatter, less ribbed, and larger it becomes." Our experience is quite contrary to this statement, for our finest examples have all been taken near high-water at the Sound and around Spanish Head. It would be interesting if members of the Society would communicate their experience in notes to the *Journal*. This species in its many forms presents a most interesting field of molluscan research.

Patella athletica Bean.—Abundant at Fleshwick. Scarce at Port Erin and the Sound. Very fine at Port St. Mary. Forbes and Hanley (*Brit. Moll.*, vol. 2, p. 426) go fully into the question of the specific rank of this form. Clarke also considered it a species; also many continental authors. The chief reasons for this seem to us to be—(a), the remarkable difference from *P. vulgata* in the colour of the animal; (b), it is always found in rock-pools left filled with water by the receding tide; (c), it is always covered with a long tuft of weeds, which frequently almost hides the shell. Jeffreys says of this (B.C., vol. 3, p. 237) "frequents rocks only at low water." We have never found it at low water, but in rock-pools *above half-tide*.

Patina pellucida L. (**Helcion**).

v. **lævis** Penn.—Large examples plentiful. We are strongly inclined to raise this variety to specific rank as it differs so markedly in habitat and texture from *P. pellucida*,

***Acmaea testudinalis* (Müll.). (*Tectura*).**—Small. Port Erin. Ballaugh (Forbes, Mal. Mon., p. 34).

***A. virginea* (Müll.).**

***Emarginula fissura* L.**—Dredged attached to stones.

***Fissurella græca* (L.).**

***Trochus (Eumargarita) helycinus* Fabr.** — Abundant at Fleshwick. Quite absent in 1900.

T. (*Gibbula*) *magus* L. — Dredged abundantly and very fine between Bradda Head and the Breakwater.

v. ***conica* Marshall.**—One amongst type off Bay Fine.

T. (*G.*) *tumidus* Mont.—Fine specimens dredged abundantly in southern area.

T. (*G.*) *cinerarius* L.

T. (*G.*) *umbilicatus* Mont.

T. (*Calliostoma*) *montacuti* Wood.—Very fine.

T. (*C.*) *miliare* (Brocchi) (*millegranus*).

T. (*C.*) *granulatus* Born.

T. (*C.*) *ziziphinus* L.

v. ***lyonsi* Lmk.**—Small.

v. ***lævigata* Sow.**—Littoral and dredged Port Erin.

***Propilidium ancyloide* (Forbes).**—Dredged off the southern districts of the island.

***Delphinoidea (Cyclostrema) cutleriana* (Cl.).**

D. *nitens* (Phil.).—Dredged off Killerland and six miles W.S.W. of Calf (26 fathoms).

D. *serpuloïdes* (Mont.).—Douglas (Forbes, Mal. Mon., p. 20, as *Skenea divisa*). Abundant, living on sea-weeds at low-water in Fleshwick Bay (Archer). Dredged six miles W.S.W. of the Calf (26 faths).

***Phasianella pullus* (L.).**—Dredged off Spanish Head (15 faths.).

***Lacuna divaricata* (Fabr.).**—Very fine specimens, in company with *Trochus helycinus*, crawling upon rocks at Fleshwick. No doubt these had come out from under weeds.

v. ***quadrifasciata* Mont.**—On fuci at low-water, rare, north coast (Forbes, Mal. Mon., p. 19).

L. *puteolus* (Turt.).—Amongst sand in Douglas Bay, not uncommon (Forbes, Mal. Mon., p. 19).

L. *pallidula* (DaC.).—On the north coast, frequent on fuci at low-water (Forbes, Mal. Mon., p. 19).

***Littorina obtusata* (L.).**—Beautiful shells of large size and varying much in colour. A pretty form, having a cross hatch marking, also occurs.

L. *rudis* (Maton).¹—In great abundance on rocky ledges, and

¹ An account of the varieties of this species, with concise diagnoses and outline figures, such as those given by Mr. J. W. Taylor of *Linnaea peregrina* (*J. Conch.*, vol. 6, p. 284) would be very welcome to students,

especially fine at Port St. Mary. Some hundreds of shells have been examined, and we find that a long series may be picked out with the type and var. *globosa* as extremes. A pretty form occurs sparingly in rock crevices with broad chocolate-coloured bands. All search for var. *jugosa* has failed.

v. ***sulcata*** Leach.—Fairly plentiful at Port St. Mary.

v. ***patula*** Thorpe.—Abundant.

v. ***globosa*** Jeffr.—Plentiful and very fine at Port Erin and Port St. Mary.

v. ***similis*** Jeffr.—Very scarce on rocks at Fleshwick. This is a most unsatisfactory variety, and should be expunged from the British List.

L. littorea L.

Rissoa parva (DaC.).

v. ***interrupta*** Ad.—Dredged alive in quantity in sea-weeds close to shore between the Biological Station and Bradda Head.

R. inconspicua Alder.

R. violacea Desm.

R. (Alvania) cancellata (DaC.).—One broken specimen from deep water on the north coast (Forbes, Mal. Mon., p. 18, and Jeffr., B.C., vol. 4, p. 10). Taken alive, Port Erin.

R. (A.) reticulata Mont.—Dredged alive.

R. (A.) calathus F. & H.—“Isle of Man” (Packe, *vide* Jeffr., B.C., vol. 4, p. 11).

R. (A.) punctura Mont.

R. (A.) abyssicola Forbes.—Dredged in tenacious mud (79 faths.), 14 miles N.W. of Port Erin, and in company with *Nucula sulcata*.

R. (Manzonina) zetlandica (Mont.).

R. (M.) costata Ad.

R. (Zippora) membranacea Ad.

R. (Onoba) striata Ad.

R. (Setia) obtusa Cantraine (***soluta***).

R. (Cingula) semistriata Mont.

R. (C.) trifasciata Ad. (***cingillus***).—Abundant at the Break-water, Port Erin; Bay-ny-Carrickey (Archer). Jeffreys says (B.C., vol. 4, p. 49):—“Every shade and gradation, as regards the colour and bands, may be observed.” Why, then, institute such varieties as *rupestris* and *graphica*? There is, unfortunately, amongst many authors, both British and continental, a mania for making new varieties of the most trifling nature. These can only lead to confusion, as in most instances the specimens are quite unattainable to workers.

Paludestrina stagnalis (Bast.) (***Hydrobia ulvæ***).—Muddy places on the shore, near Castletown (Mal. Mon., p. 18).

Jeffreysia diaphana Alder.

Adeorbis imperspicuus (Monter.).—Was dredged in April, 1893, for the first time in British seas, in 46 fathoms, nine miles west of Contrary Head (Seventh Annual Report, L.M.B.C., p. 17).

Skenea planorbis (Fabr.).—Abundant at Port Erin.

Homalogyra atomus (Phil.).—Sparingly at Port Erin (Archer).

Capulus hungaricus (L.).—Small.

Trivia europæa (Mont.) (**Cypræa**).

Natica catena (DaC.).

N. alderi Forbes.

N. montagui Forbes.—Very fine, dredged.

Lamellaria perspicua (L.).—First found by Mr. Beaumont under stones at Port Erin.

Velutina lævigata (Penn.).—Dredged off Spanish Head and Port Erin.

Cerithium (Bittium) reticulatum DaC.—One dead.

C. (Triforis) perversum L.—Southern coasts.

Cerithiopsis tubercularis (Mont.).—Dead.

Cioniscus albidus Ad. (**Aclis unica**).

Pherusina gulsonæ (Cl.) (**Aclis**).—Dredged six miles W.S.W. of Calf, 26 fathoms, in fine sand.

Odostomia minima Jeffr.—Dredged in southern area.

O. lukisi Jeffr.—Dredged off southern coasts.

O. conoïdea Brocchi.

O. acuta Jeffr.

O. conspicua Alder.—("Isle of Man" (Alder), Jeffr., B.C., vol. 4, p. 133, and F. & H., Brit. Moll., vol. 3, p. 262).

O. unidentata F. & H.

O. turrita Hanl.

O. plicata (Mont.).

O. (Brachystomia) albella Lov.

O. (B.) rissoïdes Hanl.

O. (B.) ambigua (M. & R.) (**pallida**).

O. (Ondina) divisa (J. Ad.) (**insculpta**).—Dredged alive in the southern area.

O. (O.) warreni (Thomps.).—Port Erin.

O. (Pyrgulina) decussata (Mont.).

O. (P.) indistincta Mont.

O. (P.) interstincta Mont.

O. (Spiralinella) spiralis Mont.

O. (Pyrgostelis) scalaris Mont.—Dredged one mile west of the Calf.

O. (P.) rufa var. **fulvocincta** Thomps.—The type does not occur.

O. (Turbonilla) lactea L.

Odostomia (Turbonilla) pusilla Phil.

O. (Eulimella) commutata Monter. (**acicula**). — Fresh examples dredged off Kitterland.

O. (E.) nitidissima Mont.—Dredged off Kitterland.

Eulima polita (L.).—Extremely fine specimens dredged off Port Erin and in the southern area.

E. intermedia Cant.—One or two.

E. incurva Renier (**distorta**).

E. glabra Costa (**subulata**) Don. — One dead at Port Erin (Archer).

E. bilineata (Alder).—Good specimens in rough material dredged one mile off Spanish Head (10-17 fathoms).

Cæcum imperfectum (G. Ad.) (**trachea**).

C. glabrum (Mont.).

Turritella communis (Lmk.) (**terebra**).—Small shells dredged, one being remarkably subscalariform.

Aporrhais pes-pelecani (L.).—Very good specimens dredged off Contrary Head.

Buccinum undatum L.

Neptunea antiqua (L.) (**Fusus**).

v. **striata** Jeffr.—Mr. Heathcote states that he has obtained this form.

v. **alba** Jeffr.—Occasionally.

Tritonofusus gracilis DaC. (**Fusus**).—Plentiful. The shells are fine and beautifully covered with epidermis.

T. propinquus Ald. (**Fusus**).

T. jeffreysianus Fischer (**Fusus**).

Ocenebra erinacea (L.) (**Murex**).

Trophon muricatus (Mont.).

T. barvicensis Johnston.

T. clathratus (L.) (**truncatus** Str.).

Purpura lapillus L.—Never banded or orange-coloured. Often occurs with very long spire.

Nassa reticulata (L.).

N. incrassata (Str.).

Pleurotoma (Mangilia) attenuata Mont. — Dead only. Southern coasts.

P. (M.) nebula Mont.—Dredged off Port Erin (Fauna, Liverpool Bay, I., 338 and 240).

P. (Hædropleura) septangularis.—A large example dredged off Port Erin.

P. (Bela) rufa Mont.

P. (B.) turricula Mont.—Living, Port Erin (Darbishire). Off Spanish Head.

Teres anceps (Eichu.) (**Defrancia teres**).—A most beautiful specimen dredged off Port Erin.

Clathurella leufroyi (Mich.) (**Defrancia**).—Bay Fine (Heathcote).

C. linearis (Mont.) (**Defrancia**).—One alive and several dead off Port Erin and the Calf, in rough dredged material.

C. purpurea Mont. (**Defrancia**).—Two specimens have been dredged, one very fine.

Tornatina umbilicata (Mont.) (**Cylichna**).

T. mammillatus Phil. (**Utriculus**).

Diaphana hyalina Turt. (**Utriculus**).—Dredged off the Calf (15-17 faths.).

Scaphander lignarius (L.).—Very good dredged. Found also by Mr. Wallace at Ramsey (Forbes, Mal. Mon., p. 6).

Bullinella cylindracea (Penn.) (**Cylichna**).—Southern area.

Roxania utriculus Brocchi (**Bulla**).—Was obtained by sifting mud and debris from between stones on the beach at low-water in buckets. It was found in the material at the bottom after pouring off the water and allowing to settle. This may not be an inhabitant of the Isle of Man coasts, and may possibly have been washed in by a gale.

Philine scabra (Müll.).

P. catena (Mont.).

P. angulata Jeffr.—Dredged off Port Erin.

P. aperta (L.).

Aplysia punctata Cur.—Sometimes very abundant along the northern side of Port Erin Bay between the Biological Station and Bradda Head in 5 fathoms. Also outside the breakwater: off Bay Fine; southwards towards the Calf in 10-20 fathoms.

Oscanus membranaceus Mont. (**Pleurobranchus**).—Common under large stones in rock-pools at the Poyllvaish end of Bay-ny-Carrickey (Herdman).

Pleurobranchus plumula Mont.

Otina otis (Turt.).—Mr. Heathcote says in the diary of the Station (20th July, 1890) that he found this species near the breakwater, Port Erin. He, unfortunately, lost the specimen. All search by us, both there and round Port Erin, has failed to re-discover it. Forbes says (Mal. Mon., p. 29):—"In crevices of rocks at half-tides, with *Kellia rubra*; Kirk St. Ann's Head."

Melampus bidentatus Mont.

M. myosotis Drap.

NOTES OF SHELLS OBSERVED AND COLLECTED IN EAST SUSSEX.

By WILLIAM WHITWELL, F.L.S.

(Read before the Society, Dec. 12, 1900).

I SPENT three weeks in August last at the pleasant village of Horsted Keynes in East Sussex, on the south-westerly slope from Ashdown Forest to the valley (in its upper region) of the Ouse. My own special work there was botanical, though I kept an open eye for mollusca everywhere. My nephew, J. W. Whitwell, enthusiastically devoted himself to obtaining a complete series of the shells of the district. The resulting list is a very short one, though we examined roadside banks, both rocky and herbage-covered, roadside ditches, nettle-clumps, copses, heaths, low-lying meadows, streamlet sides, pond margins, and bogs. But short as it is, it contains, judging from Mr. L. E. Adams' "Manual," no less than ten new specific records for vice-county No. 14, Sussex East.

The district we worked is entirely within that vice-county, and consists wholly of Wealden sands and clays—the clays are reached by the valleys which cut deeply down between the sandstone ridges. It forms a large portion of the upper drainage area of the Ouse, and seems to have been little explored by botanists or conchologists.

Either the district is very unproductive as regards slugs and snails, or the season was specially unfavourable, or my nephew and myself were personally unlucky or unskilful. As regards the weather, our visit to Horsted Keynes followed upon the intense heat of July, but its first days were signalized by the bank holiday with its drenching rains, and we had several other experiences of humidity varied with heat, such as might have been expected to bring out all the snails of the country side. But though we made a point of going out in the evenings after rain expressly to examine the hedge-banks, we found not a single slug and of land-shells three specimens only, of as many species. Our landlord stated that slugs and snails were almost unknown in the garden.

Subjoined is a complete list of our gatherings, which have been submitted to Mr. J. W. Taylor, F.L.S., who has kindly confirmed or corrected our determinations. The new records for the sub-county are marked with an asterisk, and specimens of them have been deposited in the Society's cabinet.

*1. *Conulus fulvus* (Müll.), one, in bed of stream below the village.

*2. *Zonitoides excavata* (Bean), one only, near Piplye.

3. *Helix aspersa* Müll., one dead only.

*4. *Planorbis fontanus* (Lightfoot), in pond on ridge between Horsted Keynes and Lindfield; Piplye ponds.

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| <p>*5. <i>P. nautilus</i> (L.), in same pond as No. 4.</p> <p>*6. <i>v. crista</i> (L.), with No. 5.</p> <p>*7. <i>P. albus</i> (L.), pond between Horsted Keynes church and the railway station road; Piplye ponds.</p> <p>*8. <i>Physa fontinalis</i> (L.), various.</p> <p>9. <i>Limnæa peregra</i> var. <i>inflata</i> Kob., affluent of Ouse, between Burnt Oak and Hayward's Heath.</p> <p>10. <i>v. labiosa</i> Jeffr., pond between Horsted Keynes church and the station</p> | <p>road.</p> <p>*11. <i>L. stagnalis</i> (L.), Piplye ponds: young.</p> <p>*12. <i>L. glabra</i> (Müll.), wayside pools on side road beyond the Great Pond.</p> <p>*13. <i>L. truncatula</i> (Müll.), one specimen, as No. 12.</p> <p>*14. <i>Velletia lacustris</i> (L.), as No. 4.</p> <p>15. <i>Sphærium corneum</i> (L.), common.</p> <p>16. <i>Pisidium pusillum</i> (Gmel.), as Nos. 10 and 12.</p> |
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PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

299th Meeting, April 10th, 1901.

Mr. Thomas Rogers in the chair.

Donations to the Library announced and thanks voted:

The usual periodicals received in exchange.

Donations to the Cabinet announced and thanks voted:

A specimen of *Eulima candida* Marratt from the Rev. R. W. J. Smart.

New Member Elected.

Mr. Robert Drummond, 20, Upper Talbot Street, Blackpool.

Candidate Proposed for Membership.

Mr. Charles Smith Carter.

Member Deceased.

Mr. G. Sherriff Tye.

It was reported that an invitation had been received from the

Glasgow University

to send representatives to its Ninth Jubilee Celebration, and further that the President and the Rev. G. A. Frank Knight had been requested by the Council to represent the Society on the occasion and had expressed their willingness to do so.

Papers Read.

"*Cypræa chrysalis* and *Cypræa microdon*" by J. Cosmo Melvill.

Exhibits.

By Mr. J. M. Williams: *Cypræa bicallosa*, *Oliva cumingi*, *O. cryptospira* and var. *albina*.

By Mr. W. J. Edwards: A fine series of *Cypræa pantherina*.

By Mr. R. Standen: *Balea perversa* var. *suecana* West., from Sweden, also, on behalf of the Manchester Museum, a set of the curious bivalve *Spatha hirundo* from the Congo River.

By Mr. J. W. Jackson: *Helix rotundata* var. *turtoni* and *Hyalinia crystallina* from Gatley Wood; *Helix arbustorum*, subscalariform, and *H. hortensis* collected during last Easter week at Cavedale, Derbyshire (alt. 1800 ft.).

By Mr. Heathcote: *Hyalinia glaber* and *Hy. cellaria* from Grange-over-Sands.

By Mr. R. Cairns: A series of an unusual form of *Oliva lepida* Duclos.

A very large and comprehensive series of *Cypræa chrysalis* Kiener, *C. fimbriata* Gmel., *C. microdon* Auct., *C. unifasciata* Migh., *C. macula* Ords., and *C. cholemondeleyi* Melv. was shewn by Messrs. Melvill, Rogers, Standen, Edwards, Hardy, Williams, and Cairns in illustration of Mr. Melvill's paper.

300th Meeting, May 8th, 1901.

Mr. Thomas Rogers in the chair.

Donations to the Library announced and thanks voted:

The usual periodicals received in exchange.

New Member Elected.

Mr. Charles Smith Carter, 172, Eastgate, Louth, Lincs.

Candidate Proposed for Membership.

Mrs. Charlotte E. Gubbins.

Exhibits.

By Mr. R. Cairns: *Limnaea stagnalis*, with reflexed lip from Hurst, Ashton-under-Lyne. *Trivia formosa* Gask., from Cape Colony, collected by Dr. Beever.

By the Manchester Museum: *Clausilie* from Japan and China.

By Mr. Laidlaw: *Rhyostoma hainesi* from Lower Siam. and a small shell allied to *Plectopylis* or *Streptaxis* from the same locality.

By Mr. Moss: Two specimens of *Plectopylis*, one being apparently viviparous. *Helix muralis* from Italy and the dart extracted from it.

It was resolved to have a

Special Exhibit of the genus Pleurodonta

at the next meeting.

NOTICE BY THE COMMITTEE FOR COLLECTIVE INVESTIGATION.

(Read before the Society, June 12, 1901).

IN accordance with the scheme which has been adopted by the Committee, a second series of five subjects for enquiry is now published. The Committee would remind members that extensive co-operation is necessary to render the scheme a success, and would request members to accord them abundant assistance and support.

- i. Are *Vallonia pulchella* and the form *costata* found together or separately? in wet or moist situations? do intermediate forms occur? does each form affect a particular kind of habitat?
- ii. Do *Tachea nemoralis* and *T. hortensis* occur together or separately? (1) in the same district, (2) in the same locality, (3) in the same kind of habitat?
- iii. Do *Clausilia rugosa* (*bidentata*) and *Balea perversa* occur together? what habitats are they usually found in?
- iv. Are there any constant differences between the radulæ of (1) *Hyalinia cellaria* and *H. alliaria*, (2) *Limnaea peregra* and *L. auricularia*, (3) *Succinea putris* and *S. elegans*, (4) *Tachea hortensis* and *T. nemoralis*?
- v. Record the circumstances attending the periodical disappearance to which certain species, such as *A. glutinosa*, *H. fusca* and *V. edentula*, are subject. How are such disappearances to be accounted for?

Returns should reach the Secretary (A. E. Boycott, The Grange, Hereford), not later than September 1st, 1902.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Nautilus, vol. 14, no. 7, November, 1900,—vol. 15, no. 1, May, 1901.

"Land Snails of Cape May, N.J.," by H. A. PILSBRY [*Succinea campestris* var. *vagans* n.]. "Mollusca of Southern Kentucky," by SADIE F. PRICE [list of 156 spp.]. "New Species of Japanese Land Mollusca," by H. A. PILSBRY [*Eulota*, *Kaliella*, *Euconulus*, *Punctum*]. "New Records of New Mexican Snails," by H. A. PILSBRY [6 spp.]. "Descriptions of New Species of Asiatic Shells," by C. F. ANCEY [*Euhadra*, *Physa*, *Helicina*].

"Records of Mollusca from New Mexico, by H. A. PILSBRY and T. D. A. COCKERELL [about 25 spp.]. "*Conus consors* Sowb.," by C. L. WHEELER [redescribed]. "New *Bulimulus* and *Spiraculum*," by HUGH FULTON [*B. inusitatus*, Costa Rica, *S. assamense*, Khasi Hills]. "New Japanese Land Snails," by H. A. PILSBRY [5 nn. spp.; *Eulota mercatoria* and *E. caliginosa* distinguished]. "On a Genus (*Phyllaplysia*) new to the Pacific Coast," by W. H. DALL [*P. taylori* n.sp.]. "A new Species of *Pleurobranchus* [*californicus*] from California," by W. H. DALL.

"New Varieties of *Physa ancillaria* Say," by B. WALKER [v. *magnalacustris* and v. *crassa*]. "New *Pisidia*," by V. STERKI [*P. tenuissimum*, Michigan, *P. monas*, Mich., *P. streatori*, Ohio]. "Shells of the Marl-Deposits of Aroostook County, Maine, as compared with the living forms in the same locality," by O. O. NYLANDER [list of fossil and living forms]. "Notices of some New Japanese Land Snails," by H. A. PILSBRY [*Eulota* n. sp. and n. var., *Trishoplita*, n. var., *Clausilia* 6 nn. spp.].

"A contribution to West Coast Conchology," by H. HEMPHILL [general introduction, European and American forms compared]. "A New *Amnicola*," by B. WALKER [*A. lelsoni*, Niagara R., N.Y.]. "Exotic Mollusks in California," by J. KEEP [few spp. apparently introduced]. "Notices of New Japanese Land Snails," by H. A. PILSBRY [5 new forms described]. "A New *Lyropecten*," by W. H. DALL [*L. dilleri*, Rio Dell horizon, Eel R., California].

"A Contribution to West Coast Conchology," by H. HEMPHILL [*Helix* 5 nn. varr.]. "A new species of *Submarginula* from California" [*S. yatesi*], by W. H. DALL. "Variations in *Odostomia*," by H. W. WINKLEY [*O. impressa*, *O. bisuturalis*, and *O. trifida*, probably one species]. "Notices of new Japanese Land Snails," by H. A. PILSBRY [*Helicina osumiensis*, *Vertigo hirasei*, *Buliminus eucharistus*, *B. luchuanus*, *Eulota* (*Aegista*) *martensiana*, *E. (Plectotropis) inornata*].

"Descriptions of Two New Species of *Glandina*," by H. VENDRYES [*G. taylori*, *G. deflorescens*, Jamaica]. "*Polygyra stenotrema* without a lip notch," by H. A. PILSBRY. "A contribution to West Coast Conchology," by H. HEMPHILL (concluded). "New North American *Sphæria*," by V. STERKI [*S. crassum*, *S. walkeri*, Michigan]. "A New *Pinna* from California," by W. H. DALL [*Atrina oldroydii*]. "*Alasmodonta marginala* and *A. truncata*," by C. L. WHEELER [former from Atlantic slope, latter from Ohio].

"New Jamaican Urocoptidae," by H. VENDRYES [*Cylindrella*, 6 nn. spp. figd.]. "Notes on *Meseschiza grosvenorii* Lea," by A. A. HINKLEY [probably young of *Angitrema armigera* Say]. "The Subspecies of *Pyramidula alternata*," by H. A. PILSBRY [7 recognized].

Records of the Australian Museum, vol. 4, no. 1, March, 1901.

"*Ctenostreon pectiniiformis*, Schlotheim, an Australian Fossil," by R. ETHERIDGE, Jr. [description and notes]. "Some New or Unfigured Australian Shells," by C.

HEDLEY [*Philobrya talei*, *Periploma micans*, *Sarepta? tellineformis*, nn. spp., figd.]. "Aperture of *Conularia*," by R. ETHERIDGE, JR. [inflection of distal end].

Proceedings of the Academy of Natural Sciences of Philadelphia, parts 2-3, March-Aug., Sep.-Dec., 1900.

"Notices of new Japanese Land Snails" [Key to *Alycaeus*; 4 nn. spp.]. "New South American Land Snails" [9 nn. spp., many figd.]. "Note on the Australian Pupidae" [4 genera diagnosed with key and figures]. "Note on Polynesian and East Indian Pupidae" [4 genera, with sections characterised]. "Additions to the Japanese Land Snail Fauna, II." [6 nn.spp. described and figd.]. "Notes on certain Mollusca of South-Western Arkansas" [Figs. of *Pleurocera elevatum* and *Goniobasis plebeius*], by H. A. PILSBRY.

"Lower California Species of *Calocentrum* and *Berendtia*," by H. A. PILSBRY [*C. eisenianum*, n. sp.]. "*Sonorella*, a New Genus of *Helices*," by H. A. PILSBRY [type *Epiphragmophora hachitana* Dall, New Mexico, Arizona]. "On the Zoological position of *Partula* and *Achatinella*," by H. A. PILSBRY [New scheme of classification; these genera in group Orthurethra]. "The Genesis of Mid-Pacific Faunas," by H. A. PILSBRY [Hypothesis advanced of a pakeozoic or early mesozoic mid-Pacific continent]. "A Partial Revision of the Pupæ of the United States," by H. A. PILSBRY and E. G. VANATTA [Several nn. varr. figd.; catalogue of species and sub-species]. "Additions to Japanese Land-Snail Fauna iii.," by H. A. PILSBRY [*Zaptyx*; *Tyrannophedusa*, nn. sectt., several nn. spp. figd.]. **Journal and Proceedings of the Hamilton Scientific Association**, no. 16, 1899-1900.

"Malacology," by Col. C. C. GRANT.

Geological Survey of Canada, Annual Report, vol. 10, 1897.

"On some Cambro-Silurian and Silurian Fossils from Lake Temiscaming, Lake Nipissing, and Mattawa Outliers," by H. M. AMI.

Transactions of the Royal Society of South Australia, vol. 24, part 2.

"Definitions of two new species of South Australian Polyplacophora," by EDWIN ASHBY [*Ischnochiton (Stenochiton) pallens*, *Callochiton rufus*, figd.]. "Definition of a new species of South Australian Polyplacophora," by M. M. MAUGHAN [*Chiton oruktus*, figd.]. "Descriptions of new genera and species of Australian Mollusca (chiefly Tasmanian)," by RALPH TATE and W. L. MAY [33 nn. spp.].

Memoirs and Proceedings of the Manchester Literary and Philosophical Society, vol. 45, part 1, 1901.

"Note on d'Orbigny's figure of *Onychoteuthis dussumieri*," by W. E. HOYLE [tuberculated surface perhaps of same nature as in *Lepidoteuthis* and *Onychoteuthis ingens*].

"**Ergebnisse einer Reise nach dem Pacific (Schauinsland, 1896-97). Die Opisthobranchier**," by Dr. R. BERGH [12 spp. *Archidoris nyctea*, *Aeolidiella drusilla*, *A. faustina*, nn. spp., *Samla* n.g. for *S. annuligera*, n. sp.].

"**Zoological Record, Mollusca 1899**," by E. R. SYKES.

Millport Biological Station, Communications, 1, November, 1900.

"Collecting Trip in S.S. *Garland*, with list of Mollusca obtained," by Rev. G. A. FRANK KNIGHT.

"**Glycogen of Snails and Slugs**, in morphological and physiological correspondence with the lymph system of Vertebrates," by C. CREIGHTON.

"**Spinning Molluscs**" (*Zoologist*, no. 709, July, 1900), by H. WALLIS KEW [An abstract of our knowledge on this subject in Mollusca other than the slugs treated of in the author's paper, read before the society, June 13, 1900].

"**Exotic Mollusca in California**," by R. E. C. STEARNS [12 imported spp. with notes].

- "Descriptions of new species of Japanese Land Shells" [14 ms.spp. unfigured], by G. K. GUDE (*Ann. and Mag. Nat. Hist.* (7), vol. 6, p. 398-401, and 453-456).
- "Description of a new species of *Plectopylis* [*P. lepida*] from Tonkin," by G. K. GUDE (*Ann. and Mag. Nat. Hist.* (7), vol. 5, p. 313).
- "Description of Two New Species of Helicoid Land Shells," by G. K. GUDE [*Epiphragmophora dormeri*, Paraguay; *Sesara monleyitensis*, Burma].
- "A list of the Slugs and Snails found at Sutton Coldfield," by ALBERT WOOD.
- Report of the Manchester Museum, Owens College, 1899-1900 [Records purchase of duplicates of Layard collection].
- "The Land and Freshwater Shells of Guernsey," and "Additional Land and Freshwater Shells of Guernsey," by E. D. MARQUAND.
- La Feuille des Jeunes Naturalistes*, no. 365, March, 1901.
- "Liste de coquilles . . . recueillies aux environs de Cancale (*fin*)," by H. MARTEL [30 spp. L.F.W.]. "Le Pupa (*Torquilla*) *similis* Brug. (*P. cinerea* Drp.)," by E. MARGIER.
- Science Gossip*, vol. 7, nos. 83-84, April-May, 1901.
- "Land and Freshwater Mollusca of Hampshire," [*concluded*] by L. E. ADAMS and B. B. WOODWARD.
- The Irish Naturalist*, vol. 10, nos. 5, 6, May-Jun., 1901.
- "Notes on the Mollusca of Co. Leitrim," by P. H. GRIERSON. "*Planorbis cornuus* in Co. Sligo," by R. WELCH. "*Amphipeplea glutinosa* in the Bann," by W. A. GREEN.

Reversed *Helices* recently found in Lancashire.—Hearing through my friend, Mr. R. Welch, of Belfast, that a gentleman in Blackpool had recently found several reversed and scalariform shells in that district, I put myself in communication with him, and am pleased to record and exhibit the following shells, all found by Mr. R. Drummond, of Blackpool:—*Helix nemoralis* m. *sinistrorsum*, 12345, 12345, 00300. One dead specimen and two living ones. Found between Blackpool and Fleetwood. (12)3(45), 12345, 12045, 00300. Four specimens of which only the last one was alive. Found between Southport and the mouth of the river Ault at Hightown. *Helix aspersa* m. *sinistrorsum*. One dead specimen found at the bottom of a wet ditch, outside an old garden, at Little Layton near Blackpool. Also one living specimen found amongst hundreds of others in an old garden near Churchtown, Southport, when the trees and hedges were being uprooted to level the ground. In addition to the above, Mr. Drummond also found both at Southport and Blackpool a good number of scalariform *H. nemoralis*, some extremely high in the spire with very deep sutures. Amongst the Southport shells I also find two specimens of the peculiar extension of the mouth after maturity, as found by me last September, at Bundoran, county Donegal. All the above shells have been found within the last two to three years. Seeing the limited number of *H. nemoralis* found on the Blackpool and Southport coasts compared with the large quantities found at Bundoran, a find of seven reversed *H. nemoralis*, three of which were alive, is very remarkable, and leads us to hope that others will be as successful if they will only work these districts thoroughly.—EDWARD COLLIER, Feb. 27, 1901 (*Read before the Society*, March 13, 1901).

ON THE MUCUS-THREADS OF LAND-SLUGS.

By H. WALLIS KEW.

(Read before the Society, June 13th, 1900).

FOR some time past the writer has been attempting to get together the scattered information concerning the mucus-threads of slugs, shell-bearing molluscs, planarians, etc.: animals of creeping locomotion, ordinarily leaving a slime-film in their path.

The phenomena presented, though not of wide importance, are of some curiosity; and it is found that the threads in question, though often merely of locomotory mucus, may yet serve for progression, during descent or ascent, through air or water, and may be retraversed by the animals.

I have submitted a paper to the "Zoologist" (ser. 4, vol. 4, p. 289-320, 1900) on the threads of shell-bearing molluscs and sea-slugs, and to the "Naturalist" (1900, p. 307-317) on those of planarians; and the present paper, from considerations of space, deals with land-slugs only. It is mainly bibliographical; but I have ventured to detail a few observations of my own, and have been permitted to give a few others communicated by correspondents. For help with papers in languages other than English, and in other matters, I am much indebted to the kindness of Mr. G. K. Gude.

PART I.

BIBLIOGRAPHY.

1. **Lister, M.** *Historiæ Animalium Angliæ*, 1678, p. 129-30.

On one occasion, about the month of June, Lister observed slugs, in dark woods, hanging from the branches of trees, each on a single thread, two feet long, made of their own slime. The animals pertained to the author's *Limax cinereus maximus striatus* & *maculatus*: our *L. maximus* or possibly *L. arborum*.

2. **Hoy, T.** Account of a Spinning *Limax*, *Trans. Linn. Soc.*, vol. 1, 1791, p. 183-5.

A slug was found suspended from a Scotch-fir:

It was hanging by one line only, which was attached to its tail. This line or thread at a distance of one inch and a half from the animal, appeared to be as fine as those spun by the *Aranea diadema*, but nearer to its body it was thicker; and, at its junction to the tail, was broad and flat, exactly corresponding to the tail itself. The Slug was four feet below the branch from which it was suspended, and at the distance of four feet and a half from the ground; to which it was approaching gradually at the rate of an inch in about three minutes, slower considerably than its ordinary motion, either upon the ground or even in ascending the trunk of a tree, not so slow, however, as one would expect, if it is considered that a slug is not furnished . . . with a particular reservoir of glutinous liquid, . . . but that the line by which it descends, is drawn from that slimy, glutinous exudation gradually secreted from its pores, and covering its whole body. It seemed to require a great degree of exertion

in the animal to produce a continual supply of this liquid, and to make it flow towards its tail. For this end it alternately pushed out its head, and drew it back again below its shield; turning it as far as possible, first to one side and then to the other, as if thereby to press its sides, and so to promote its secretion. This motion of the head in a horizontal direction to one side, made its whole body turn round; whereby the line by which it hung was necessarily twisted, and from being flat became round. Besides, it might perhaps tend to draw off the glutinous matter, and thus lengthen the line; which could scarcely be effected merely by the weight of the slug.

The animal is characterised as *Limax (filans) cinereus margine flavo*; and has been variously referred to *Agriolimax agrestis*, *Limax flavus*, and *L. arborum*; and Mr. Roebuck has suggested to me that it may have been *Arion subfuscus*. It is certainly not a distinct kind of slug distinguished by the faculty of making thread, the spinning-slug (*Limax filans*) of authors being a myth—a name applied to any slug observed to spin. Férussac erroneously supposed Hoy's slug to be necessarily identical with spinning-slugs of Latham (4); these belonged to *Agr. agrestis*, and were referred by Latham to a variety of that species—*Limax albus clypeo flavescente* Müller. This variety, subsequently named *L. agrestis* var. *filans* by Moquin-Tandon, has been raised to the rank of a species by Mabille as *L. filans*.

3. Shaw, G. *Tom. cit.*, p. 185.

Shaw adds a note made in 1776:

Sitting in an arbour about eight feet high I was amused with a very uncommon spectacle, which I at first took for a Caterpillar hanging by its thread, and reaching to within a foot of the ground; . . . on a nearer view I perceived it, to my great surprise, to be a small Slug, about three-quarters of an inch in length. It hung by the extremity of its tail, and gradually descended till it almost touched the ground, when I shook it off with my finger.

This observation and that of Hoy make it clear, Shaw says, that the animals of the genus "*Limax*" have a power of occasionally managing their glutinous excretion in such a manner as to serve the purpose of a thread in a direct descent.

4. Latham, J. Observations on the Spinning *Limax*, *Op. cit.*, vol. 4, 1798, p. 85-9.

Latham records observations made by Montagu on *Agriolimax agrestis*:

On my friend's putting one of them on the projecting frame of a window, it immediately crawled forwards till it came to the projecting angle, from whence, without attempting to fix itself by its fore parts to any thing, it became visibly suspended by a thread from its tail. When it had descended about two feet, the Colonel took it up by the thread, and carried it to a distant room; but in trying to fix it afresh . . . the thread broke. He then put it on a frame about four feet from the ground; in a few minutes it was again suspended, and observing by his watch, descended at the rate of three inches and a half in a minute. . . . When the Slug was near the ground, an attempt was made, by taking hold of the thread near to the body, to fix it afresh, but the thread again broke, as it did likewise on being tried three other times with the same view, each time the Slug having nearly reached

the floor. At last he fixed the end to a stick, by which he was enabled, by turning the stick round, to wind up the thread faster than it was produced. The thread; however, soon broke, and after these trials, although the Slug made several attempts to spin, it as often fell to the ground; on which it was put into wet moss, and the next day seemed so far to have recovered . . . as again to go through the former experiments. . . . The secretion, of which the thread was formed, was wholly from the under parts, and not from the back or sides; . . . nor did it proceed from any orifice in the tail, for in some experiments it was suspended by the tip of the tail, at other times from full an eighth of an inch on one side of it. . . . It was by means of an undulating motion of the belly, similar to that in the act of crawling, that the flow of the viscous secretion was produced towards the tail.

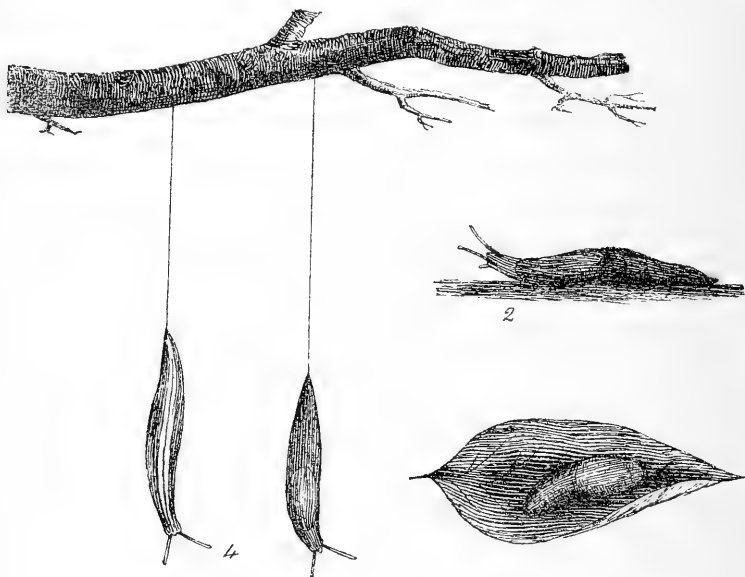


FIG. 1.

After Latham, *Trans. Linn. Soc.*, vol. 4, 1798, pl. 8, figs. 1-4.

The paper is accompanied by drawings which I have copied in fig. 1. The author thought it possible that every *species* of "Limax" was able to spin. Montagu had noticed, however, that some *individuals* could not be induced to do so.

5. Cuvier, G. Mémoire sur la Limace (limax) et le Colimaçon (helix), *Ann. Mus. Hist. Nat.*, vol. 7, 1806, p. 146.

. . . La limace a encore sur son extrémité postérieure une petite ouverture qui manque au colimaçon, et d'où sort de temps en temps une espèce de mucosité qui se dessèche aisément, et dont l'animal se sert pour se suspendre aux divers corps.

Limax=*Arion*; it is a mistake to suppose the caudal-gland to be concerned in spinning.

6. Davies, H., in Pennant's British Zoology, vol. 4, 1812, p. 76.

A slug observed suspended from a projecting part of a building.

7. Férussac. Histoire Naturelle générale et particulière des Mollusques terrestres et fluviatiles, 1819, p. 34-6, 73-4.

Férussac chiefly observed *Agriolimax agrestis* of which he figures a suspended individual (fig. 2). He is the first to regard the thread as a continuation of the slime-trail of ordinary progression:

Les espèces que nous avons examinées se laissent tomber sans la moindre hésitation, lorsqu'elles veulent arriver à un plan inférieur. Elles attachent aux corps qu'elles quittent, l'extrémité d'un fil, ou mieux de la lame muqueuse qu'elles laissent habituellement sur les surfaces, et qui est transsudée par les pores du plan locomoteur; cette petite lame se continue en un fil plat et triangulaire de la forme de la partie terminale de ce plan. Mais bientôt ce fil change de forme par suite des efforts combinés que fait cet animal, et qui tendent à le tirer, à l'arrondir, en même temps que les côtés du plan locomoteur se contractent sur le véritable pied, qui par un mouvement d'ondulation amène vers sa pointe, où se file le petit câble, toute la matière muqueuse que la contraction latérale peut produire.

8. Bree, W. T. Spinning Slugs, *London's Mag. Nat. Hist.*, vol. 2, 1829, p. 69.

. . . I have before me . . . a slug which I discovered suspended by the tail from the leaves of a tree for the space of about a foot or more. . . . I have several times met with these spinning slugs suspended by their threads.

9. M. Spinning Slugs, *Tom cit.*, p. 303.

. . . On very many occasions have I observed the descent of the common grey and common green-bellied slug [sic] from trees and bushes, . . . any small snail [slug], in good health, can let itself down from almost any height to the ground, by the tenacity of the slime exuded retromissively from the pores of the belly. The same muscular motion of the belly, exerted on giving motion to this footless animal on the ground . . . is also exercised in the air; adding thereby to the length of the suspending line till they reach the ground.

10. Bouchard-Chantereaux. Catalogue des Mollusques terrestres et fluviatiles observés jusqu'à ce jour à l'état vivant dans le Département du Pas-de-Calais; *Mém. Soc. d'Agric. &c., Boulogne-sur-Mer* (2), vol. 1, 1837, p. 166.

The author several times saw young *L. arborum* descend from one branch of a tree to another. The creatures, with the posterior part of the foot fixed to the branch they wished to leave, were seen stretching out the anterior parts as if seeking for a support; and not finding one they commenced a descent, during which the foot

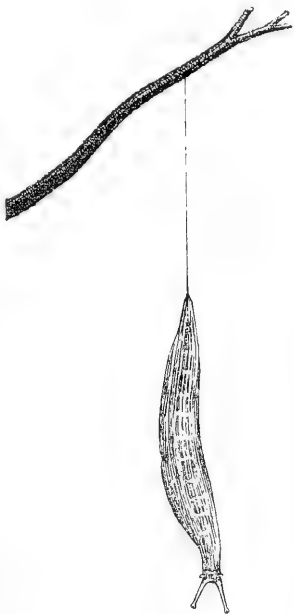


FIG. 2.

After Férussac, *Hist. Nat. gén. et part. Mollusques terr. et fluv.*, 1819, pl. 5. fig. 9.

exhibited the same undulatory movement seen on the foot of a slug crawling on a piece of glass.

11. d'Orbigny, A., in Webb & Berthelot, *Histoire Naturelle des Iles Canaries: Mollusques*, 1839, p. 48.

Limax carinata, d'Orb. (Teneriffe) is figured letting itself down from a twig (fig. 3). It is an *Amalia*: (young of *A. gagates*?).

12. Gray, J. E., in Turton's *Manual of the Land and Fresh-water Shells of the British Islands*, 1840, p. 115.

A statement about the formation of a thread, derived from Fleming's "British Animals," 1828, p. 256, and relating to *Agriolimax agrestis*, is placed by mistake under *Limax flavus*.

13. Clarke, B. J., in Thompson's *Catalogue of the Land and Fresh-water Mollusca of Ireland*, *Ann. & Mag. Nat. Hist.*, vol. 6, 1841, p. 203-5.

Clarke writes of *Agr. agrestis*, referring to the yellowish young as *Limax filans*:

I had the gratification of seeing them repeatedly let themselves drop down to the table from the lid of a tin box, where for the purpose of taking some drawings of the different varieties they were held. A similar feat was performed by the full-grown and dark varieties, which were on the same box with *Limax filans*, but they did not appear to possess the same facility, and were more reluctant in resorting to this expedient for escaping from the confined space on which they were placed.

Limax carinatus [= *Amalia sowerbyi*] placed on a laurel, made use of the same means of conveying itself to the ground; and any spinning slug, it is added, if left on an evergreen or other uncongenial tree soon escapes by a thread.

14. Laurent & d'Orbigny. *Extr. Proc. Verb. Soc. Philom. Paris*, 1841, p. 118.

Laurent referred, incidentally, to "*Limax filans*," and d'Orbigny recalled that he had recorded spinning by *Limax canariensis* [= *L. flavus*]. He used the name, possibly, in mistake for "*Limax carinata*" (11).

15. Binney, A. Descriptions of some naked air-breathing Mollusca inhabiting the United States, *Boston Journ. Nat. Hist.*, vol. 4, 1842, p. 168-71, 175.

Agr. agrestis suspends itself head downwards, and lowers itself from plants and fences by forming a mucous thread. It is occasionally seen in this situation in rainy weather. *Agr. campestris*, also, suspends itself; and a small *Arion*, in the neighbourhood of Boston, exhibits the same faculty; as also does *Pallifera dorsalis*,



FIG. 3.

After A. d'Orbigny, in Webb & Berthelot, *Hist. Nat. des Iles Canaries, Mollusques*, 1839, pl. 3, fig. 7.

16. Clarke, B. J. On the species of the genus *Limax* occurring in Ireland, *Ann. & Mag. Nat. Hist.*, vol. 12, 1843, p. 341.

The young of all our British species "have the power of using a thread until they attain that size when the weight of their bodies becomes too great"; they then invariably fall when the tail approaches the edge of the object from which they allowed themselves to slide. The author had made the following species spin: *L. arborum* (young), *Amalia sowerbyi* (young), *Agr. agrestis* (young and adult), *Arion hortensis* (young and adult), and *A. ater* (young only).

17. Macgillivray, W. History of the Molluscous Animals of the counties of Aberdeen, Kincardine, and Banff, 1843, p. 77.

L. flavus: I suspect that this may be a perpetuation of the error of Gray (12).

18. Morelet, A. Description des Mollusques terrestres et fluviatiles du Portugal, 1845, p. 38.

Limax squammatus—stated by authors to be *Geomalacus anguiformis*—suspends itself by a thread.

19. Saunders, W. W. Singular habits of *Limax filans*, *Zoologist*, vol. 8, 1850, p. 2825.

A slug can turn upon its suspensory thread and ascend it:

A short time since I noticed in a greenhouse . . . a small slug . . . gradually descending head foremost to some plants placed on a stand below . . . I noticed my interesting acquaintance descend several inches in a few minutes; and when it had completed a suspending-thread of fully eighteen inches in length, I quite unintentionally put an end to its progress, by examining its outstretched eyes too closely with a magnifying lens. After this affront the slug commenced a retreat, which it got about by curving the head portion of the body upwards and inwards, until it touched the hinder portion of the body, a part of which it actually climbed up, and then took to the suspending-thread, advancing up the thread several inches with great facility, although the thread at the time was oscillating considerably with the draught of air through the greenhouse.

"*L. filans*" here is probably *Agr. agrestis*. A statement in Tate's "Land and Freshwater Mollusks of Great Britain," 1866, p. 79, is evidently derived from Saunders; the facts are applied, however, to *L. arborum*.

20. Binney, A. Terrestrial air-breathing Mollusks of the United States, vol. 1, 1851, p. 175; vol. 2, 1851, p. 4-5, 22-42.

In addition to the information already given (15), Binney notes that young of *L. flavus* (introduced from Europe), and those of *Philomycus caroliniensis* suspend themselves by threads. He writes further:

. . . During the whole operation the locomotive disk is in active undulatory motion, in the same manner as when in ordinary progression. . . . The slug often pauses in its descent, and extends its tentacles and its whole body in various directions, as if seeking some object on which to make a lodgment. The faculty of suspending themselves in this manner indicates that they pass some part of their

lives on trees, from which they can thus make a convenient descent to the earth. . . . It may serve also as a means by which they can suddenly escape from the attacks of their enemies, and particularly of birds. . . . They often remain suspended in mid-air for a time, and it is not unlikely that there is some pleasurable sensation connected with the act, which induces them thus to prolong it. We have seen the descent actually practised by every one of our Atlantic species.

Binney gives, without description, a wood-cut of a slug descending from a twig (fig. 4). The information is repeated by W. G. Binney (*Terrestrial air-breathing Mollusks*, vol. 5, 1878), and the figure is said to represent *Agr. campestris*; after the statement "we have seen the descent actually practised by every one of our Atlantic species," is added "as well as by the large Pacific *Ariolimax*;" but this is a mistake, for Mr. W. G. Binney tells me that he has not seen *Ariolimax* suspended. Dr. Cooper has stated that *Ariolimax columbianus*, in dense damp forests near the Pacific, "not unfrequently drops from the trees,"¹ but this, as Dr. Cooper informs me, does not mean that the creature lowers itself by a thread.

21. Forbes & Hanley. *History of British Mollusks*, vol. 4, 1853, p. 287.

"*Arion flavus*"—probably *Arion minimus*—suspends itself.

22. Reeve, L. *Land and Freshwater Mollusks indigenous to or naturalized in the British Isles*, 1863, p. 26.

Limax maximus—size not indicated—escaped from a glass on a mantel and let itself down into the fender, a distance of 3-4 feet, in about five minutes.

23. Harte, W. Note on certain movements of the Limacidae, *Proc. Nat. Hist. Soc. Dublin*, vol. 4, 1865, p. 182:

Some time since my attention was caught by a slug descending from the branch of a tree in my garden, and which had lowered itself by a thread some three or four feet. . . . I observed one fact which I believe is new, viz., that they possess the power of re-ascending by means of the same thread; and I am inclined to think that this accounts for the fact of their being so seldom seen descending. The leaving the branch in the first instance I believe to be altogether an involuntary act. A slug descends by creeping along a drooping branch, when it comes to the extreme point of which it may be seen projecting over the end, seeking for fresh footing, its body meanwhile slipping down by gravitation; and at last, having lost its hold, it is supported only by means of a thread. . . . It continues to descend by gravitation alone; and if the condition of the animal, or the atmosphere, is not



FIG. 4.

After Binney, *Terrestrial Air-Breathing Mollusks of the United States*, vol. 1, 1851, p. 175.

¹ Cooper, "Nat. Hist. of Washington Territory," 1859, p. 377.

favourable . . . it stops after having lowered itself a few inches. The body is then slightly curved upwards; and after seeking for a while for a landing place, it is coiled into a spiral form, from the centre of which the head is elevated along the thread, and the position of the animal becomes reversed; . . . the animal then ascends with a tolerably even gyratory motion, the "slack" of the thread sometimes accumulating below the tail. Having inverted a branch of a weeping ash tree with several forks on it, into a flower pot, and by putting some of the slugs upon the branches, I have never found any difficulty in getting them to descend, sometimes as much as five or six feet. The slug which I have found to possess this power is the small grey garden slug, particularly the whitey-brown, or yellowish-grey one (*Limax arborum*). . . . I have had as many as four suspended from a forked branch at the same time, three of which returned a distance of five inches, and one two inches, and all reached the branch, and crept along it again. They are very apt to return shortly after they have commenced to descend. . . . To perform the experiment of getting the slugs to do this, they should be collected the day before, and kept under a glass shade, as the secretion is too thin to form a sufficiently strong thread for their support if they are gorged with food.

The slug referred to—certainly not *L. arborum*—is doubtless *Agr. agrestis*. I am indebted to Dr. Scharff for an opportunity of seeing this paper.

24. Tate, R. On the Land and Freshwater Mollusca of Nicaragua, *American Journ. Conch.*, vol. 5, 1870, p. 154.

Agriolimax americanus (Nicaragua) can suspend itself. The name has been referred (with *Agr. campestris*, etc.) to *Agr. levis*.

25. Tye, G. S. Molluscan Threads, *Science Gossip*, 1874, p. 49-52.

A paper dealing with the mollusca generally; as regards slugs the author refers to Bouchard-Chantereaux, Reeve, etc.

. . . When a snail crawls (either a terrestrial or an aquatic species) it leaves behind it a trail of mucus, which it discharges for the purpose of lubricating the foot in its passage over any surface, and if the continuity of this mucus be not ruptured, we have a thread in all respects analogous to those I am speaking of.

This remark is noteworthy for the author was unacquainted with Férussac (7) who suggests the same fact.

26. Harte, W. Molluscan Threads, *Tom. cit.*, p. 117.

Harte calls attention to his paper (23):

. . . If, when it has descended some distance, say eight or ten inches, the finger moistened with a slightly saline solution—say saliva—is applied to it beneath, it deliberately turns itself up . . . and re-ascends by a steady motion . . . If there is no projection of the edge of the branch to throw it off, it scarcely ever fails to land upon the branch and return the way it came. . . . I do not believe the thread is used as a means of voluntary descent, but that being frequently subjected to the mishap of slipping off, they have acquired the power of recovering themselves in this way, which they do so systematically as to leave no doubt about its being a voluntary action enabling them to avoid descending into water, or anything injurious.

27. T., R. S. Slug-threads, *Op. cit.*, 1875, p. 190:

. . . In a greenhouse, from a vine-leaf which was within a few inches of the glass and about four feet from the surface of the water in a tank, a slug was hanging by a thread, which was more than four feet in length [?] . . . The thread,

which was highly elastic, was increased about three inches in a minute. The slug was white, and about one and a half inches in length.

28. Daniel, J. E. Thread-spinning by Slugs, *Tom. cit.*, p. 206.

29. Jousseau, F. Faune Malacologique des environs de Paris, *Bull. Soc. Zool. France*, 1876, pp. 31, 109-11.

Jousseau observed the descent of "*Limax gaudefroyi*"=*Arion subfuscus*; and supposed, erroneously, that the mucus used came from the caudal-gland. He also refers to the descent of "*Limacella fulva*"=*Limax fulvus*, Norm., and of "*Limacella brunnea*,"=*Agriolimax leviss*. The thread of the last-named attained a length of several decimetres before breaking.

30. Eimer, T. Ueber fadenspinnde Schnecken, *Zool. Anz.*, vol. 1, 1878, pp. 123-4.

Eimer saw, in his garden, in the early morning sun, *Agr. agrestis* lowering itself by a long thread from a leaf of a mulberry. It was hanging at a distance of about a metre from the leaf. The thread continued to increase in length, but the animal fell when about a foot from the ground: the thread at that moment being about six feet long. The author is the first to suggest that slugs chiefly spin when they find it necessary to escape from exposure to the rays of the sun, etc. The thought occurred at once, he says, that the slug, sitting upon the leaf, had been surprised by the sun, and had adopted this means of withdrawing from the unpleasant influence. On being placed on a grass stem, held vertically in the hand and exposed to the sun, the creature soon crept to the lower extremity, and became suspended on a thread, which broke after attaining the length of about a foot. Eimer repeated this experiment, and found that the slugs sometimes made a thread and sometimes fell without one; both these cases happened when the slugs had no chance of creeping into the shade; when they had this chance they availed themselves of it. After communicating his observations to the Würtemberg Natural History Union, Eimer heard from a correspondent that a gentleman, whose bean fields were much infested with slugs, had dusted the creatures with lime, with the result that each slug so treated crept quickly to the edge of the leaf on which it was sitting, spun a thread, let itself down to the earth, and soon died. Repeating this experiment, Eimer found that *Agr. agrestis*, when dusted with lime, exhibited great alarm, and quickly descended by a thread.

31. Tye, G. S. Molluscan Threads, *J. Conch.*, vol. 1, 1878, pp. 401-15.

Tye repeats his paper (25), with additions including references to Hoy (2), Shaw (3), Binney (20), and Harte (26). He had witnessed

the descent of *Agr. agrestis* and *Arion hortensis*; and was satisfied that the habit was common to all slugs:

Mr. Harte says that if a slug be gorged with food, the slime is . . . not able to sustain it; but if kept over-night without food, it performs well next morning. This is a very interesting fact as showing that when the creature is in a condition when it would be likely to require the thread most, viz., hungry and in search of food, it is in a condition best suited to produce it; and this further strengthens my belief (contrary to Mr. Harte), that the thread is used as a means of voluntary descent. . . . When in search of new feeding grounds, during its excursions, it would often come to the edge of an object and launch itself into space upon the chance of finding a landing again soon, or if it did not, returning to its old one.

32. Martens, E. von. Zur Kenntniss der fadenspinnenden Schnecken, *Zool. Anz.*, vol. 1, 1878, pp. 249-51.

The thread is drawn together, the author says, from the whole slime-covering of the animal, whose body it embraces like the network of a balloon; but this is a mistake. References are given to Lister (1), Hoy (2), Shaw (3), Latham (4), Cuvier (5), Férussac (7), Clarke (13), Macgillivray (17), Forbes & Hanley (21), Harte (23), etc.

33. D. T. Slugs spinning threads, *The Field*, vol. 54, 1879, p. 145.

A curious habit of the common slug [probably *Agr. agrestis*] has come under my notice. . . . Owing to the wet season, the clover placed in the loft over my horses contains hundreds of them, and of course they very soon seek an escape to *terra firma*. Dozens of them may be seen letting themselves down by their slime, slowly gyrating their bodies so as to spin it into a thread. Their rate of descent is about an inch a minute. The height they descend is about nine feet, and they are capable of spinning a thread of slime sufficiently long to reach the ground.

34. Warner, R. Slugs in Orchid-Houses, *Gard. Chron.*, n.s., vol. 14, 1880, p. 405:

When no other way is open to them, they crawl up some plant or rafter, and . . . let themselves down to the spikes. I have known a small one let itself down eighteen inches, and doubtless it could have gone much further.

35. Warner, R. Slugs in Odontoglossum-Houses, *Op. cit.*, vol. 16, 1881, p. 722:

. . . I caught a slug this morning letting itself down from the rafter. . . . When it had got to the ground, seven feet from rafter, I killed it—a small black one, about one inch long.

36. W[ard], J., in Roberts' Topography and Natural History of Lofthouse, 1882, p. 332:

. . . I had occasion to lift a plank which had lain some time among grass and on the under-side I noticed a small slug, *Limax agrestis*. On being turned to the light the animal crept a few inches to the edge of the plank, and . . . began to form a slimy thread, by the aid of which it let itself slowly and safely down to the ground, a distance of three feet.

37. Roebuck, W. D. Slime spinning by *Arion hortensis*, *Journ. Conch.*, vol. 4, 1883, p. 82.

Arion hortensis v. *rufescens* [= *A. subfuscus*]:

Being placed on a flat paper-knife it walked straight off it, seemingly into the air, and even while the end of its tail was the only part in contact with the paper-

knife it maintained its horizontal position, swinging to the perpendicular one on finally quitting it and becoming suspended. It then spun a thread of about four inches, and when contact was broken on its reaching a support, the thread immediately shrunk into a minute, scarcely visible point of slime.

38. **Ashford, C.** Land and Freshwater Mollusca round Christchurch, South Hants., *Op. cit.*, vol. 5, 1887, p. 158.

Agriolimax laevis.

39. **W. J.** *Science Gossip*, vol. 23, 1887, p. 71:

. . . Whilst looking at my aquarium, I saw hanging to a leaf . . . a small grey slug of about three-eighths of an inch long; it was twisting itself about and gradually letting itself down, till at length it reached the water, when it suddenly dropped.

40. **Webb, W. M.** *Tom. cit.*, p. 124.

A large *Amalia sowerbyi* let itself down three inches or so before dropping.

41. **Zykoff, W.** Bemerkung über fadenspinnende Schnecken, *Zool. Anz.*, vol. 12, 1889, p. 584.

The author was watching the growth of young *Arion empiricorum* = *A. ater*, which had hatched from the egg under his care, and which lived, from August to the end of May, in a vivarium, covered with a bell-glass half-a-foot high. On one occasion, late at night, some of the slugs were observed to have crawled to the top of the interior of the bell-glass, and to have commenced to descend by threads; and some, without having touched the bottom, reascended by the threads to their former place. The habit was afterwards observed on several occasions, until an accident caused the death of the slugs.

42. **Collinge, W. E.** Land and Freshwater Mollusca of Oxfordshire, *Conchologist*, vol. 1, 1891, p. 12:

L. arborum.

43. **Kew, H. W.** The faculty of food-finding in Gastropods, *Naturalist*, 1893, pp. 150-1:

. . . Observations of a surprising character have been made also by Mr. Robert Warner, F.L.S. When no other way to the orchids is open to the creatures, as he stated in 1880, 'they crawl up some plant or rafter, and . . . let themselves down to the spikes.' In 1889 the observer assured me that he had actually seen many little slugs suspending themselves by slime-threads from the rafters, and 'descending on the spikes' of . . . *Odontoglossum alexandræ*; and thus many spikes, thickly wadded round with cotton-wool (which the slugs could not travel over) and growing in pots surrounded with water, had been lost. It can hardly be supposed, I think, that the slugs, having tried to approach the flowers in the ordinary manner by crawling over the pots and stems and finding themselves intercepted by moats of water or collars of cotton-wool, would deliberately ascend the rafters for the purpose of lowering themselves to the spikes. . . . We can well imagine, however, that, having once detected the presence of the flowers, the creatures would instinctively endeavour to reach them, and observers familiar with the use of slime-threads by slugs will understand that individuals happening to crawl along the rafters until immediately above the spikes would be likely, in reaching out

towards them, to relinquish their hold and become suspended upon threads which would be gradually lengthened until the spikes were reached.

44. Crawshay, De B. Slugs descending by a line of slime, *Gard. Chron.* (3), vol. 18, 1895, p. 160:

. . . To-day my gardener pointed out to me a slug he had killed. The slug was nearly three inches long; he had crept up the glass, and did not know how to get to an *Odontoglossum cordatum* that hung seven inches below him. He slimed all around himself on the glass, a patch of two inches in diameter, and then let himself down to the plant, touching the suspending wire in his descent. After he had alighted, the rope of slime still hung from glass to plant.

45. W. R. Slugs descending, *Tom. cit.*, p. 190.

"Small white slugs" were seen descending from vines in a hothouse. One lowered itself from a stick to a depth of a foot, and upon the leaf which was used to entice it being removed, it turned in the air and climbed up the thread. The animals sometimes descended from the vines more than three feet; but they "could only ascend a few inches in a moist and warm vinery, when by repeatedly touching their heads they were compelled to climb up their own bodies to the thread."

46. Blandford, E. Slugs descending, *Tom. cit.*, p. 191:

. . . I have seen them in the act many a time, especially amongst corn-stacks at harvest-time. For instance, the last load of Wheat taken up after the dew has settled on the straw late in the evening may remain on the waggon all night, and should the stubble be somewhat grassy, and slugs abundant, many of them would be located at the butt-end of the sheaves; this end would be placed outward on the waggon or on the stack, and in either case would soon get dry. The slugs which happen to be there find the surroundings uncongenial, and at once descend to the ground by means of a line made of slime.

47. Foreman. *Tom. cit.*, p. 191:

. . . I have seen slugs descend . . . once at the Moat Nurseries, East Grinstead, and once at Holmwood Park, Dorking. At the first-mentioned place, the slug descended on to a *Primula*, and in the other on to a *Cineraria*. The slugs descended from three to four feet to get at these plants.

48. Thomson, W. *Tom. cit.*, p. 216:

. . . I have caught this species [*L. arborum*] coming down from a tree in Knole Park, Sevenoaks.

49. Woolford, C. *Tom. cit.*, p. 244:

. . . I well remember calling my employer's attention . . . as a slug was descending over a *Masdevallia*. . . I saw a slug on the flower-spike of an *Odontoglossum*, and in order to prove if tobacco would prevent them crawling up the spikes, I placed a piece of "shag" tobacco on each side of the slug, and after going to and fro a few times, it let itself off very slowly by the slime from its tail.

50. Taylor, J. W. Monograph of the Land and Freshwater Mollusca of the British Isles, vol. 1, 1899, pp. 316-8.

Agr. agrestis seen by Mr. Crowther descending from an elm had made seven feet of thread. An illustration, on p. 317, is based on figs. 5 and 6 in the present paper.

(To be continued).

ON SOUTH AFRICAN MARINE SHELLS, WITH DESCRIPTIONS OF NEW SPECIES.

BY EDGAR A. SMITH.

(Read before the Society, June 12th, 1901).

(PLATE I.).

IT was proposed in a former paper¹ to issue from time to time others dealing with the marine mollusca of South Africa. Through the energy of Mr. J. H. Ponsonby, who has got together from his South African correspondents the material upon which the present paper is based, I am enabled to make a first fulfilment of that proposal. Specimens of nearly all the species described or referred to, are in the British Museum, having been presented by Mr. Ponsonby.

1. *Glyphis spreta*. (Pl. I., fig. 18).

Fissurella fimbriata Sowerby (nec Reeve), Mar. Shells South Africa, p. 48, 1892.

Testa elongato-ovata, antice paulo angustata, depressa, costis gracilibus numerosis (quarum paucis posticis aliis majoribus), et incrementi lineis elatis squamosis cancellata, albida, rufo picta et variegata; foramen multo ante medium situm, ovatum vel rotunde ovatum; pagina interna albida, rufo obscure nebulosa, radiatim haud profunde sulcata, ad marginem crenulata. Longit. 25 mm., diam. 16, alt. 8.

Hab., Mossel Bay, Cape Colony (J. Crawford).

Quite distinct from *Fissurella fimbriata* of Reeve, with which it was confounded in the "Marine Shells of South Africa." It is a longer and narrower and more depressed species, with the foramen much less central. The sculpture is very similar, although not absolutely identical. The edge of the interior is much less deeply notched than in *F. fimbriata*, which exhibits a fine radiating striation within, which is less observable in the present species.

2. *Glyphis elizabethæ*. (Pl. I., fig. 12).

Fissurella sieboldii Sowerby (nec Reeve), Mar. Shells South Africa, p. 47, 1892.

Testa elongato-ovata, antice paulo angustata, depressa, costis præcipuis novem (quorum duo posticis aliis majoribus) et costellis numerosis gracilioribus in interstitiis instructa, lineis incrementi concentricis squamose tenuiter cancellata, pallida, costis rufis, vel albis rufo maculatis, ornata, in interstitiis interdum nigro obscure radiata; foramen subcirculare, multo ante medium situm; pagina interna albida, infra

¹ *J. Conch.*, vol. 9, p. 247, 1899.

costas præcipuas sulcata, sulcis ad marginem profundis et prolongatis, inter sulcos crenulata. Longit. 44 mm., diam. 28, alt. 13.

Hab., Port Elizabeth (J Crawford).

This species is quite distinct from *Fissurella sieboldii*, differing in colour, form, and sculpture. It is a longer shell and more depressed, and not arched behind the foramen, the central of the posterior costæ being depressed and not elevated. The costæ also are radiately striated, not acute, but broader, especially the three posterior ones. These are conspicuously prolonged, producing a strongly festooned margin behind. They have a roughish subnodose appearance, caused by strong marks of arrested growth. The intervening costellæ are much finer and vary in thickness, sometimes being alternately finer and coarser. They are beautifully scaled by the crossing of the close-set lines of growth which produce a finely cancellated surface. The apical hole is surrounded within by a circumscribed callus, which is truncate, but hardly pitted behind. The interior is white, or may show faintly the dark rays which sometimes occur on the outer surface. Young shells exhibit only eight principal costæ, the ninth, the posterior central one, not developing until later in life.

3. *Glyphis elevata* Dunker.

Fissurella elevata Dunker; Philippi's Abbild., vol. ii., p. 67, pl. II., fig. 4, 1845; non Pilsbry, Man. Conch., vol. xii., p. 217, pl. 39, figs. 8, 82-85, 1890.

Hab., Cape of Good Hope (Dkr.).

Mr. Pilsbry considers this species, together with *F. imbricata* Sowerby, *F. australis* Krauss, and *F. nigriradiata* Reeve, as synonyms of *F. rüppellii* Sowerby. This is a most unfortunate lumping, and would not have occurred if he had examined the types. I believe he is right as regard *F. nigriradiata*, which evidently is only a small or half-grown specimen of *rüppellii*. On the contrary, both *australis*, *imbricata*, and *elevata* are perfectly distinct from it and one another. The last species, besides a slight difference in form, has a greatly superior number of much finer costæ, and a very differently shaped foramen. Dunker gives the number of riblets at 180,¹ but in the shells before me, which I regard as belonging to his species, I find only about 100-114. On the contrary, *F. rüppellii* has only 40 to 50. The apical callus within in *F. elevata* is peculiarly truncate and deeply pitted behind, and very different to that of *F. rüppellii*.

4. *Macrochisma producta* var.

Macrochisma producta A. Adams; Pilsbry, Man. Conch., vol. xii., p. 194, pl. 59, fig. 62, 1890.

¹ It seems probable that the 8 and 0 have been transposed and that the number intended was 108.

var. = *M. angustata* A. Adams; Pilsbry, op. cit. p. 194, pl. 59, fig. 61.

Hab., Port Elizabeth (Sow.); Pondoland (Brit. Mus.).

The Pondoland specimens are shorter than typical South Australian examples of this species, agreeing, in this respect, with the form *angustata*, which appears to me a variety of *producta*, rather than a distinct species. The South African specimens have the foramen extending forward to the middle of the shell, even further than in typical *producta* and decidedly further than in the form *angustata*. I cannot discover any differences worthy of notice in any of the varieties of sculpture or style of colour. Three out of four of the Pondoland specimens exhibit a slight sinus or indentation of the margin at the posterior end, with a very deep excavation above it, in which respect it agrees with *M. megatrema* A. Adams.

5. **Patella? decemcostata.** (Pl. I., fig. 22).

Testa parva, depressa, costata, costis decem obtusis, subnodosis, radiatim striatis, albida, inter costas nigro-fusco maculata, lineis incrementi irregularibus sculpta; interstitia inter costas æque radiatim striata, interdum costa minore instructa; apex flavescens, mediocriter acutus, paulo antemedianus; superficies interna nitida, albida, fusco radiata margine exteriori irregulariter angulato vel rotunde dentato. Longit 9 mm., diam. 7, alt. 4.

Hab., Algoa Bay.

This does not appear to be the young of any of the known species. The three specimens examined rest upon the anterior and posterior ends, the sides rising slightly in the middle. Of the ten principal costæ, three radiate towards the front, five posteriorly, and one on each side laterally. When the soft parts are examined this form may prove to be an *Acmæa*.

6. **Acmæa roseoradiata.** (Pl. I., fig. 19).

Testa parva, depressa, alba, lineis radiantibus roseis numerosis picta, apicem versus sæpe rosacea, lævis, incrementi lineis irregularibus sculpta; apex leviter erosus, ideo haud acutus, circiter in $\frac{1}{3}$ longitudinis situs; latus anticum recte declivè, vix concavum, posticum levissime convexum; superficies interna albida, roseo-radiata, interdum in fundo rosacea, lævis, nitens; margo simplex, ad latera leviter elatus; cicatrix magna, antice lata. Longit. $5\frac{3}{4}$ mm., diam. $4\frac{1}{2}$, alt. 2.

Hab., Cape Town (W. F. Williams and T. J. Simey, in Brit. Mus.).

Somewhat resembling *Acmæa virginea*, but smaller, without radiating sculpture and the interior is not margined in the same manner. The rays are about 18 to 20 in number, and pinker than in *A. virginea*. In fresh specimens the apex would probably be acute and somewhat curved over anteriorly.

7. **Acmaea albonotata.** (Pl. I., figs. 14, 16).

Testa parva, irregulariter oblongo-ovata, mediocriter conico-elata, radiatim tenuiter confertim liratula vel costulata, costis lineis incrementi conspicue sculptis, extus sordide albidis, indistincte griseo-radiata, intus in medio rufo-fusca, ad marginem crenulatum flavescens, maculis albis et rufis notata; cicatrix pallida; apex acutus, paulo antemedianus. Longit. 10 mm., diam. 8, alt. 6.

Hab., Umkomaas, Natal (H. Burnup).

A very small species, of a whitish tint, varied with indistinct greyish rays, which are best seen by transmitted light towards the outer margin. The fine radiating liræ vary in thickness, and are rendered somewhat scabrous by being crossed by the closely packed conspicuous wavy lines of growth. The inner surface within the muscular impression is generally of a rich reddish brown colour, the scar itself being frequently whitish and the border beyond yellowish spotted with white and a few red dots, corresponding to the pale and darker rays which ornament the shell. Most of the specimens examined when resting on a flat surface touch only at the ends, arching slightly at the sides. According to Professor Gwatkin, the radula is like that of *Acmaea*.

8. **Rissoia crawfordi.** (Pl. I., fig. 13).

Testa pupæformis, solida, levis, sordide grisea, supra purpurascens; anfractus 5, convexiusculi, sutura leviter obliqua sejuncti, ultimus pone valde oblique descendens; apertura obliqua, rotunde ovata, parva; peristoma continuum, fortiter incrassatum. Longit. $4\frac{1}{3}$ mm., diam., $1\frac{1}{2}$. Apertura cum perist. 1 longa.

Hab., Algoa Bay, 20 fath. (J. Crawford).

Remarkable for its pupoid form, solidity, smoothness, and the small aperture.

9. **Radius gracillimus.** (Pl. I., figs. 20, 21).

Testa gracilis, utrinque attenuata, supra pallide carnea, infra flava, transversim tenuissime striata, lineisque incrementi decussata; extremitates callo conspicuo supra terminatæ; apertura undulata, linearis, antice paulo latior; labrum intus reflexum, flavum, extus callo lato minute corrugato dilute carneo linea flava marginato instructum; labium callo flavo in medio crasso indutum. Longit. 31 mm., diam. $4\frac{1}{2}$.

Hab., from the stomach of a fish caught in 40 fathoms, ten miles from Durban (Quekett).

Remarkable for its very slender form, being even narrower than *R. philippinarum* Sowb. or *R. lanceolatus* Sowb. It differs from the latter in being more produced at both ends, and in being smoother. The striæ in *lanceolatus* are stronger and punctate, a feature not noticed by the monographers.

10. **Cerithium rufonodulosum.** (Pl. I., fig. 8).

Testa elongata, turrita, alba, seriebus duabus nodulorum ruforum acutorum ornata; anfractus circiter 10, turriti, supra concavi, deinde biangulati, longitudinaliter costati, costis ad angulos acute nodulosi et rufis, infra suturam serie pustularum rufarum et albarum parvarum ornati, in interstitiis undique spiraliter tenuiter sulcati, ultimus ad sinistram varice obliquo instructus, infra medium seriebus duabus pustularum parvarum rufarum et albarum ornatus; apertura alba, longit. totius circiter $\frac{3}{11}$ adaequans; labrum leviter expansum, ad marginem tenue, extra incrassatum; columella oblique arcuata, callo tenui albo induta; canalis anterior brevis, obliquus, recurvus. Longit. 22 mm., diam. 8, apertura 6 longa, 4 lata.

Hab., Algoa Bay (H. Burnup).

The two series of acute red nodules at once distinguish this species from all the other South African forms. The pustules beneath the suture and those upon the lower part of the body-whorl are quite small and close-set, some being white and others red. The fine spiral sulci and intervening liræ with which the entire surface is sculptured, are visible even to the naked eye. The figure of *C. nigro-punctatum* Sowb. (Thes. Conch., vol. ii., p. 860, pl. clxxx., fig. 97) is very like this species.

11. **Odostomia lavertinae.** (Pl. I., fig. 15).

Odostomia angasi Sowerby (nec Tryon) Marine Shells South Africa, p. 26, 1892.

Testa ovato-conica, turrita, alba, subpellucida, anguste perforata, nitida, lineis incrementi tenuibus striata; anfractus sex, sublente accrescentes, primus rotundatus, cæteri leviter convexiusculi, sutura profunda sejuncti, turriti, infra suturam linea pellucida marginati, ultimus ad peripheriam obsolete rotunde angulatus; apertura inverse auriformis, circiter $\frac{1}{3}$ longit. totius adaequans, antice subeffusa; columella leviter reflexa, prope perforationem dente valido munita. Longit. $3\frac{1}{2}$ mm., diam. $1\frac{3}{4}$. Apertura $1\frac{1}{4}$ longa, 1 lata.

Hab., East London, Cape Colony (Lavertine).

A semipellucid species with distinctly turreted whorls and a conspicuous columellar tooth. Collected by Miss Maud Lavertine, whose name I have associated with the species.

30. **Lamellaria mauritiana** Bergh.

Sigaret de Maurice Quoy and Gaimard, Voy. Astrolabe Atlas, pl. 66bis fig. 9, 1833.

Marsenia (Chelyonotus) mauritiana Bergh, K. Dansk Videnskab. Selsk. Skrift., 1853, vol. iii., p. 343, pl. v., fig. 2.

Lamellaria mauritiana Tryon, Man. Conch., vol. viii., p. 62, 1885.

Hab., Port Elizabeth; Mauritius (Quoy and Gaimard, &c.).

The *Sigaretus tonganus* of Quoy and Gaimard and the *Coriocella nigra* of Blainville are probably identical with this species.

The shell from South Africa is of interest on account of its very large size, the diameter of the body whorl being 50 mm., whereas in ordinary examples it is only about 30-36. It is also rather thicker and more solid than usual, probably the result of age, and is covered with a thin deciduous pale straw coloured periostracum.

12. ***Eulima translucida*** (Pl. I., fig 11).

Testa minuta, breviter obtuse subulata, pellucida, vitrea, polita; anfractus sex, primus magnus, rotundatus, sequentes fere plani, ultimus ad latera leviter curvatus, mediocriter elongatus; apertura elongate piriformis; peristoma levissime incrassatum, margine columellari anguste reflexo. Longit 2½ mm., diam. ¾. Apertura ¾ longa, ½ lata. Hab., East London, Cape Colony (Miss M. Lavertine).

A very minute slender shell, but rather obtuse at the apex, and so transparent that the columella is visible to the apex.

13. ***Eulima algoensis***. (Pl. I., fig. 10).

Testa parva, alba, polita, infra suturam zona pellucida angusta instructa, subulata, leviter curvata; aufractus 12? leviter convexi, sensim accrescentes, sutura levissime obliqua sejuncti, ultimus ad peripheriam rotundus; apertura piriformis, longit. totius ¼ haud æquans; labrum arcuatum, in medio prominens; columella leviter incrassata et reflexa, superne callo tenui labro juncta. Longit. 8 mm., diam. 2. Apertura 1½ longa, 1 lata.

Hab., Algoa Bay, Cape Colony.

Allied to *E. atlantica* Smith, but having more convex whorls, with a narrower pellucid zone below the suture. It also has a different curve in the whole length, and is more clavate in its general form. Both of the specimens examined have lost the apex, and consist of only eight whorls.

14. ***Scala millecostata*** Pease. (Pl. I., fig 5).

Scalaria millecostata Pease, Proc. Zool. Soc., 1860, p. 400.

Hab., Sandwich Islands (Pease); Isipingo, Natal (H. Burnup).

Two specimens from the latter locality seem to be inseparable from this species, of which I have seen only a single specimen (the type) from the Hawaiian Islands. They have the thread-like riblets even more crowded, there being as many as forty on the last whorl. They are slender, oblique, and so much reflexed that they really become almost hollow tubes. The normal whorls are eight in number, very convex, and exhibit between the riblets spiral striæ which, however, are only seen when the reflexed portions of the riblets are broken away. Length 9 mm., diam. 6½; Aperture 3 long, 2½ wide.

15. **Peristernia leucothea** Melvill.

Peristernia leucothea Melvill. Mem. Manchester Lit. and Phil. Soc., 4th ser., vol. iv., p. 399, pl. ii., fig. 15, 1891.

Latirus (Peristernia) leucothea Sowerby, Marine Shells of South Africa, p. 17, 1892.

Euthria eburnea Sowerby, Proc. Malac. Soc., vol. iv., p. 1, pl. i., fig. 2, 1900.

Hab., Port Natal (Melvill); Umkomaas and Isipingo, Natal (H. Burnup); Pondoland (Sowerby).

A comparison of the figures referred to would not lead one to the conclusion that the *Euthria eburnea* of Sowerby was identical with the present species. Mr. Sowerby's type, recently acquired by the Museum, is in an exceedingly worn condition and only exhibits traces between the costæ of the thread-like lines with which this species is sculptured. The aperture also is so worn that both the liræ within the outer lip and the somewhat obscure columellar plications are only just traceable.

There are two distinct forms of this species, the one entirely white, the other being more or less stained with purple-brown in the depressions between the ribs, with a yellowish band below the suture and a more distinct brownish or yellowish one around the middle of the body-whorl, bordered below with a conspicuous white thread. The aperture is purplish or purplish-brown within. The white thread referred to is also quite noticeable on the typical white form. The variety is rather like *P. pulchella* Reeve in colour, but differs in size and form.

16. **Melapium elatum** Schubert and Wagner.

Pyrula elata Schub. and Wag., Conchyl. Cab., vol. xii., pp. 92 and 94, pl. ccxxvi., figs. 4012-13, 1829.

Melapium elatum, Smith, Ann. Mag. Nat. Hist., 1889, vol. iii., p. 269.

Hab., from the stomach of a fish caught in 40 fathoms, about ten miles from Durban (Quekett).

It is interesting to have a definite locality for this species, hitherto known only from "Indian Seas."

17. **Euthria queketti**. (Pl. I., fig. 1).

Testa fusiformis, fusco-olivacea, plicis nodosis albis ornata; spira elongata, turrita; anfractus $8\frac{1}{2}$, *duo superiores globosi, læves, pallidi, cæteri supra concavi, in medio nodose plicati, infra rectiusculi et leviter contracti, spiraliter striati vel lirati, lineis incrementi tenuibus decussati; anfr. ultimus ad angulum fortiter nodosus, antice attenuatus, rostratus (rostro recurvo, sinistrorsum verso), supra medium transversim haud profunde sulcatus; apertura ovalis, alba, antice in canalem angustum producta; labrum intus tenuiter liratum; colum-*

ella arcuata, callo albo induta. Longit. 47 mm., diam. 20. Apertura cum canali 25 longa, $6\frac{1}{2}$ lata.

Hab., from the stomach of a fish caught in 40 fathoms ten miles from Durban (Quekett).

Very different from any known species and remarkable on account of the nodules upon the middle or angle of the whorls. These are ten in number upon the last whorl, large and white, with a brown stain between them. The nodules become less pronounced upon the upper part of the spire, being scarcely developed upon the three first normal volutions.

It is a more slender species than the Mediterranean *E. cornea*, having a longer anterior canal and at once distinguished by the nodose angle of the whorls.

18. **Tritonidea natalensis.** (Pl. I., fig. 23).

Tritonidea subrubiginosa Sowerby (nec Smith), Journ. of Conch., vol. vii., p. 368, 1894.

Testa ovato-fusiformis, spiraliter fortiter sulcata et lirata, periostraco crasso olivaceo et piloso induta, infra periostracum dilute rufescens, circa medium anfr. ultimi albo zonata; spira acuminata, ad apicem mamillata; anfractus 7, primus globosus, levis, tres sequentes convexiusculi, longitudinaliter oblique costati, et liris transversis quaternis, supra costas subnodosis, ornati; penult. et ultimus costulis simplicibus transversis instructi, in interstitiis spiraliter tenuissime lirati; apertura elongata, inverse subpiriformis, alba, longit. totius $\frac{1}{2}$ æquans; labrum ad marginem tenue, extra leviter incrassatum, intus liris brevibus novem (suprema cæteris majori), instructum; columella supra leviter arcuata, infra medium obliqua, et uniplicata, superne tuberculo elongato munita, callo tenui circumscripto albo induta. Longit. 22 mm., diam. 11. Apertura 11 longa, $4\frac{1}{2}$ lata.

Hab., Durban (H. Burnup).

The periostracum is thick, longitudinally striated, hairy, and quite conceals the colour of the shell beneath. The last whorl has a slight constriction at the upper part which produces as it were a thickening below the suture. In some specimens one or two slight tubercles are observable near the so-called fold upon the lower part of the columella. *T. subrubiginosa* Smith, from Japan, is very similar, but smaller, has more convex whorls, a thinner periostracum, and the longitudinal costæ continued on the upper part of the body-whorl, which lacks the groove or depression which occurs in the present species.

19. **Nassa algida** Reeve. (Pl. I., fig. 17).

Nassa algida Reeve, Conch. Icon., vol. viii., figs. 145a, 145b, 1853.

Hab., Moreton Bay, Australia (Reeve); Durban, Natal (H. Burnup).

Four specimens from Durban, all different in colour and form, show that this species, like many others of this genus, is very variable. Two are nearly normal as regards coloration, but the one figured is unusually large and has a distinctly channelled suture. In typical specimens of the species the upper whorls are longitudinally costate with a distinct transverse groove cutting across the tops of the costæ, thus forming a row of nodules. In the Natal shells there are three such sulci which produce four rows of granules. In the latter also the aperture is somewhat less contracted and the outer lip less thickened externally. One of them is globose in comparison with the rest and has a shorter spire than usual. The following dimensions show the variation in size:—

| | Length. | | Diameter. | |
|------|---------|-----|-----------|----|
| (a). | 31 | ... | ... | 18 |
| (b). | 26½ | ... | ... | 17 |
| (c). | 25 | ... | ... | 14 |
| (d). | 23 | ... | ... | 13 |

N. algida was considered by Tryon¹ as a variety of *N. picta*, from which, however, in my opinion, it is quite distinct. I would add that the "lumping" of species in that monograph is simply grotesque and quite on a level with the colouring of the figures.

20. **Columbella (Astyris) lightfooti.** (Pl. I., fig. 3).

Testa ovato-fusiformis, parva, albida, lineolis transversis gracilibus fuscis interruptis picta; spira producta, ad apicem rotunde obtusa; anfractus 5, primus magnus, globosus, probabiliter levis, cæteri convexiusculi, spiraliter tenuiter sulcati (sulcis in anfr. penult. circiter 8, in ultimo 18–20), ultimus oblongus, paulo infra medium zonam haud lineatam exhibens; apertura parva, subangusta, albida, longit. totius circa $\frac{5}{12}$ aequans; labrum extra incrassatum, ad marginem acutum, fusco-lineatum, superne vix sinuatum; columella alba, supra medium arcuata, infra obliqua, callotenui induta. Longit. 6 mm., diam. $2\frac{1}{2}$. Apertura $2\frac{1}{2}$ longa, 1 lata.

Hab., Kalk Bay, Cape Colony (R. Lightfoot).

This pretty species is well characterized by the style of coloration and the transverse sulcate sculpture. The interrupted transverse lines fall upon the slightly raised ridges between the sulci, and the interruptions are so regular that the shell presents series of short lines one under another. The grooving upon the anterior end of the body-whorl is finer than that above.

21. **Columbella (Anachis) burnupi.** (Pl. I., fig. 2).

Testa minima, oblonga, turrita, pellucida, cerea, lineis 2–3 transversis interruptis nigro-fuscis circa medium anfractuum ornata; anfr. 6–7,

superiores 1-2 convexi, læves, cæteri turriti, convexiusculi, longitudinaliter costati et spiraliter lirati granosæ cancellati (costis in anfr. penult. 14, lirisque 7-8), ultimus infra medium paulo contractus, costis inferne desinentibus, antice oblique liratus, liris rufo punctatis; labrum leviter incrassatum, superne haud profunde sinuatum, intus tuberculis paucis armatum; columella supra leviter curvata, infra obliqua, callo tenui induta; canalis anterior obliquus, recurvus. Longit. $4\frac{1}{2}$ mm., diam. $1\frac{1}{2}$. Apertura 2 longa.

Hab., Natal (H. Burnup).

The colour of this species is very characteristic. The ground colour is a transparent yellowish waxy tint. This is varied with three interrupted dark reddish or brownish lines round the middle of the upper whorls, and one or two opaque white granules upon alternate costæ at the same part of the whorls. The body-whorl also has the oblique liræ round the lower extremity dotted with red interrupted lines. This style of coloration recalls that of *Columbella monilifera* Sowerby from the Bahamas, etc. (= *Pleurotoma fuscolineata* C. B. Adams = *Pl. scalpta* Reeve). The radula according to Prof. H. M. Gwatkin is columbelloid.

22. *Murex fallax*. (Pl. I., fig. 9).

Testa abbreviato-clavæformis, solida, sordide albida, zonis interruptis fuscis picta; spira brevis, gradata; anfractus normales 6, supra planiusculi, declives, in medio angulati, nodulis acutis validis compressis ad angulum instructi, varicibus tribus muniti, ultimus antice rostratus, circa medium seriebus tribus nodulorum ornatus; infra spinis validis tribus armatus; rostrum fere rectum, fusco tinctum, liris paucis obliquis instructum; apertura oblique ovata, alba; peristoma fere continuum, margine externo anguste reflexo, subtuberculato, intus lævi, columellari dilatato, reflexo; canalis anterior fere clausus. Longit. 78 mm., diam. 41. Apertura 17 longa, 12 lata.

Hab., from the stomach of a fish caught in 40 fathoms ten miles from Durban (Quekett).

In general form allied to *M. haustellum* Linn. and *M. chrysostoma* Gray. It differs from the former in colour and sculpture and in having three conspicuous spines upon the upper part of the rostrum. In this respect it somewhat resembles *chrysostoma*, from which it may at once be separated by the smaller size of the aperture, the smoothness of the labrum within, and the absence of transverse liræ upon the columellar callus. This species has generally three tubercles at the angle of the whorls between the varices, but sometimes only two.

23. *Sistrum squamosum* Pease var.

Sistrum squamosum Pease, Amer. Journ. Conch., vol. iii., p. 277, pl. xxiii., fig. 14, 1868.

Hab., Umkomaas, Natal (H. Burnup); Kingsmill Islands (Pease); Philippine Island and Sarawak (Brit. Mus.).

The somewhat worn specimens from Natal have all the rows of nodules blackish, the interstices being yellowish, whereas in the typical form only the first and third rows are black, the second and fourth being white. The Philippine and Bornean examples resemble the South African form. The species is variable not only in colour but also in form and in the acuteness or obtuseness of the nodules, &c.

24. ***Marginella burnupi*** Sowerby.

Marginella burnupi Sowerby, Mar. Shells South Africa, appendix, p. 10, pl. 6, fig. 35, 1897.

M. inconspicua Sowerby, junior (non Sowerby, senior), *op. cit.*, p. 20.

M. cinerea Sowerby (non Jousseaume), *op. cit.* append., p. 9.

Hab., Port Elizabeth.

In this species there are always six columellar folds and sometimes a trace of a seventh, although Mr. Sowerby quotes only five. The two anterior ones are conspicuously larger than the rest. The outer lip is not greatly thickened, and it is finely but not conspicuously denticulate within. The spire is more elevated in some specimens than in others and is far from being "almost flat." The shells referred to *M. inconspicua* and *M. cinerea* by Mr. Sowerby are quite distinct from those species, and, in my opinion, are small examples of *M. burnupi*. Having the types of the two species referred to in the Museum for comparison, I can speak with certainty upon this point. I have already shown (*Proc. Zool. Soc.*, 1890, p. 266) that *M. cinerea* has only three folds on the columella, not four, as stated by Reeve, and that it occurs at the island of St. Helena. As originally described by Sowerby, *M. inconspicua* has four folds, and the outer lip is smooth. It appears to have been somewhat tinted and not a pure white shell like *burnupi* and *cinerea*. It is possible that *Cystiscus capensis* of Stimpson may be the same as the present species, but the description is so meagre that the identification is quite impossible.

25. ***Marginella algoensis***. (Pl. I., fig. 4).

Testa parva, alba, breviter piriformis; spira brevissima, obtusa, vix supra anfractum ultimum elatum; anfractus tres, celeriter accrescentes, sutura conspicua sejuncti; primus convexus, obtusus, ultimus piriformis, mediocriter convexus; labrum incrassatum, usque ad apicem fere productum, intus læve; columella callo tenui induta, plicis parvis circiter 7 instructa; apertura angusta, antice latior. Longit. 4 mm., lat. 3.

Hab., Algoa Bay, Cape Colony.

The anterior columellar fold or that which passes round the end of the aperture into the outer lip is rather larger than the rest. The

species is allied to *Marginella* (*Prsicula*) *polyodonta* Vélain.¹

26. ***Marginella epigrus* Reeve.**

M. epigrus Reeve; Sowerby, Marine Shells South Africa, p. 20; appendix, p. 32, 1892.

Hab., Port Elizabeth.

A single specimen, presented by Mr. Ponsonby to the Museum, appears to be inseparable from this Mogador species. Six folds on the columella are generally present, although Reeve mentions only four. The two upper ones are, however, very small, and might easily be overlooked.

27. ***Clavatula parilis*. (Pl. I., fig. 7).**

Testa elongato-pyramidalis, alba, lineis et maculis pallide rufis picta; spira subulata, ad apicem parvum mamillata; anfractus 11, duo superiores læves, convexi, cæteri planiusculi, infra suturam cingulo prominente convexo cincti, læves, lineis incrementi tenuibus undulatis striati, ultimus convexiusculus, infra medium contractus; apertura alba, longit. totius $\frac{3}{4}$ adæquans, antice late canaliculata; labrum tenue, infra cingulum subprofunde sinuatum, in medio arcuatim prominens; columella leviter arcuata, callosa. Longit. 40 mm., diam. 16. Apertura 16 longa, 6 lata.

Hab., from the stomach of a fish caught in forty fathoms ten miles from Durban (Quekett).

A smooth white shell, varied with a few pale reddish undulating irregular lines, and some blotches of the same colour upon the rounded thickening or girdle at the upper part of the whorls. It is smaller than *C. taxus* (Chemnitz), and without any tubercular costæ on the upper whorls and differently coloured.

28. ***Terebra textilis* Hinds, var.**

Terebra textilis Hinds; Sowerby, Thesaurus, vol. i., pl. xlv., fig. 73; Reeve, Conch. Icon., vol. xii., fig. 13a.

Hab., Manila Bay, Philippines, 6 fathoms; Natal (H. Burnup).

The specimen from Natal is a trifle stouter than the type, and the row of deep punctures which marks off the infrasutural zone is less pronounced, and the costæ at this point are less (if at all) constricted, and about one less in number upon a whorl. More specimens are required to see whether these differences are more or less constant. The transverse sulcations between the costæ are similar in both forms.

29. ***Terebra* (*Abretia*) *diversa*. (Pl. I., fig. 6).**

T. rufopunctata Sowerby (nec Smith), Mar. Shells South Africa, p. 12, 1892.

Testa subulata, polita, purpureo-fuscescens, infra suturam zona alba rufo-nigro vel rufo punctata, et zona altera alba circa medium anfractus ultimi ornata; anfractus 12, fere plani, supra ad suturam

tenuiter plicati, plicis infra evanidis, spiraliter haud striati; lente accrescentes; apex magnus, obtusus, lævis, rufo tinctus; anfr. ultimus convexiusculus, antice albus; apertura intus fuscescens, zona alba mediana et altera basali picta, longit. totius $\frac{1}{5}$ æquans. Longit. 27 mm. diam. 5. Apertura 5 longa, $2\frac{1}{3}$ lata.

Hab., Umzinto, Natal (H. Burnup).

Somewhat resembling *T. rufopunctata*, but longer and more slender, with a larger and blunter apex. The white bands at the suture and around the middle of the body-whorl are more defined, and the reddish or purple-brownish ground colour is different. Spiral striation, which is quite evident in *T. rufopunctata*, is entirely absent in this species.

31. *Venus declivis* Sowerby.

Venus declivis Sowerby, Thes. Conch., vol. ii., p. 730, pl. 157, figs. 123, 124, 1853; Reeve, Conch. Icon., vol. xiv., pl. 23, fig. 111, 1863.

Hab., —? (Sowerby and Reeve); Gulf of Guinea (Brit. Mus.); Durban Bay, Natal (Quekett).

I have seen only a single specimen from the South African locality. It is not absolutely identical with the type, being larger and with a rather more broadly curved ventral margin to the valves. It has the same style of colouration and concentric delicate lamellæ.

32. *Macoma retrorsa* Sowerby.

Tellina retrorsa Sowerby, Conch. Icon., vol. xvii., fig. 234, 1867.

Tellina (Macoma) candidata Sowerby, Journ. of Conch., vol. vii., p. 375, 1894; Marine Shells South Africa, Appendix, p. 23, pl. vi., fig. 25, 1897.

Hab., Durban (H. Burnup).

The type of *T. retrorsa* quoted as in Mus. Sowerby, was subsequently acquired by Mr. Lombe Taylor, after whose death it was purchased by the British Museum. Having also, for comparison, the types of *T. candidata*, presented by Mr. J. H. Ponsonby, I am able to pronounce with some degree of certainty the identity of the above-named species.

BRACHIOPODA.

33. *Kraussina atkinsoni* (T. Woods).

Kraussia atkinsoni Tenison Woods, Proc. Roy. Soc., Tasmania, 1878, p. 57.

Kraussina atkinsoni Davidson, Trans. Linn. Soc., 1887, vol. iv., p. 127, pl. xxi., figs. 5, 6.

Hab., Algoa Bay, Cape Colony (Brit. Mus. presented by J. H. Ponsonby).

Previously known only from South Tasmania.

CYPRÆA CHRYSALIS Kien. AND C. MICRODON Gray.

BY JAMES COSMO MELVILL.

(Read before the Society, April 10, 1901).

IN November, 1892, I read before the Conchological Society¹ a resumé of the history of *Cypræa chrysalis* Kien., a species long overlooked, misunderstood, or confused with *C. fimbriata* Gmel., drawing attention to the fact that it was in all probability—nay, almost certainly—a good species, and basing this decided opinion on the acquisition of a specimen in fine condition, formerly in the collection of Mr. C. W. Viner, of Bath, and with a ticket attached in the handwriting of L. C. Kiener, as "*C. chrysalis*, mihi." It is necessary to re-open the question now, as, during the past few months a considerable flood of new light has been thrown on it, and these fresh developments I will at once proceed with seriatim.

M. Vayssière, professor of biology in the University of Marseilles, last autumn forwarded me several doubtful species and varieties of *Cypræa*, mostly, if not entirely, belonging to the Museum attached to the University, to diagnose and name for him. Amongst these were three specimens of *C. chrysalis* Kien., one, in fine condition, being the original Kienerian type figured in "Iconographie Coq. Viv.," pl. 54, f. 4, 4a, and from that source copied by all subsequent monographers of the genus. This specimen, which I had imagined existed in the Paris Museum, was certified as the type in the hand-writing of the author, and it exactly agrees in every particular with my own, which may be called the second type, or co-type, as having also passed through the hands of, and been critically differentiated by its original discoverer. Mr. R. Standen has a fine series of this species, all similar, from Borneo; Mr. J. R. Hardy two from the collection of the late Mr. Arthur Adams. It is to be seen, but not in fine condition in the Manchester Museum, from Lifu (Hadfield Collection) in which locality it was rare; good examples likewise exist in the collections of Messrs. Thomas Rogers, J. W. Edwards, and J. M. Williams; Mr. R. Cairns also has it fine from Mauritius and other localities.

In our National Collection at South Kensington it has not been fully understood as a species, and I detected a specimen or two mixed up with *C. fimbriata* Gmel. in the table cases.

Mr. Raymond Roberts² and Sowerby³ consider both *C. microdon* and *C. macula* good species, and this dictum has been generally followed. In the "Survey of Cypræa," 1888, however, I esteemed both these varieties merely of *C. fimbriata*.

1 *J. of Conch.*, vol. 7, pp. 120-122, 1893.

2 Tryon, "Man. Conch.," vol. 7, p. 169.

3 "Thes. Conch. Cypræa," p. 30, figs. 385, 386.

I have since examined very many series of all these forms, and find, as regards *C. microdon* (so called) Gray, *C. fimbriata* Gmel. (including *C. macula* Ad., and *C. cholmondeleyi* Melv., which I think are merely size varieties, green, tinged with chestnut), and *C. chrysalis* Kien., that the fine small teeth of the last-named average 25, labially, the ridges not extending far over the surface; that, secondly, *C. microdon* possesses about 20 teeth, also minute, delicate, and fine, while, lastly, the coarser teeth of *C. fimbriata* and its varieties only average about 16, each channelled over, say, one-third of the labial surface. Besides these dental differences, let us consider other distinctive characters, and formulate them tabularly, viz.:—

| (A) <i>fimbriata</i> (Gmel.). (B) <i>microdon</i> Auct. (C) <i>chrysalis</i> Kien. (non Gray). | | |
|---|--|---|
| I. Once or twice banded, or blotched dorsally. | Usually chestnut colored, twice delicately banded. | Very obscurely twice banded. |
| II. Minutely dotted dorsally. | Minutely chestnut dotted. | Very obscurely and sparsely dotted. |
| III. Chestnut brown. | Chestnut brown. | Dun colour. |
| VI. Spotted laterally, spots distinct, coarse. | Spots very sparse or absent. | Finely spotted laterally. |
| V. Extremities violet tinged, never protruded. | Extremities nearly as in <i>fimbriata</i> , perhaps however, slightly more produced. | Extremities decidedly produced. |
| VI. Body whorl rounded, not pyriform. | Body whorl depressed and flattened, in one variety slightly pyriform. | Body whorl roundly ventricose and pyriform. |

Allowing for a certain amount of variety in any true species, I am inclined to change my former opinion as to the specific distinctness of the Cowry generally known as *C. microdon*, and to follow Roberts, Sowerby, and others, in assigning to it specific rank, basing this mainly on its uniformly depressed body whorl, and very small fine teeth. It will thus stand as an intermediate form between *C. chrysalis* Kien. and *C. fimbriata* Gmel., with the undoubted varieties of the latter lately mentioned.

Now, as regards the nomenclature:—It occurred to me, early in March last, to examine at the British Museum (Natural History) the types of *Cypræa* in the Gray Collection, which fill two drawers or more beneath one of the table cases. They are all mounted in the old-fashioned way, with cement on tablets. Amongst them is a decorated, but unmistakeable, specimen of *chrysalis* Kien.; labelled "*microdon*," this being the actual type of the shell described by S. Gray in 1828¹ as follows:—

1 J. E. GRAY, Additions and Corrections to a Monograph on *Cypræa*, a genus of Testaceous Mollusca, etc., *Zoological Journal*, vol. 6, 1828, pp. 66-88.

"II. *C. microdon* n.s.

Testa oblongo-ovatâ, anticé attenuatâ, albidâ, brunneo minutè punctatâ; basi albâ, rotundatâ, extremitatibus subproductis, roseis, aperturâ angustâ, dentibus minutis, approximatis, subæqualibus.

Inhabits Pacific Ocean. Mus.: Stuchbury, Nostr.

Shell oblong-ovate, attenuated in front, slender, whitish, minutely dotted with brown; base rounded, white, extremities slightly produced, rose-red, margin rounded, mouth narrow, teeth minute, close together, nearly equal, front of the columella concave, with the teeth extended over it.

Axis $\frac{3}{8}$, diameter $\frac{1}{8}$ -of-an-inch.

Though worn, the shell is marked with an obscure central yellowish band; the base is white, the spire flat and small, and the extremities of a pale pink colour."

There is no doubt about this type; and one is therefore justified in proclaiming that the crux of the whole matter, and the solution of the mystery, so long perplexing to cypræologists, is that *C. microdon* Gray (1828) is *C. chrysalis* Kien.

Through the kindness of Mr. C. Davies Sherborn, I am informed that the whole of the section *Cypræa* in Kiener's "Coquilles vivantes," undated, was published in 1845. The name *microdon* therefore must be restored, and stand for typical *C. chrysalis*, which latter becomes a synonym.

It will thus be necessary to give a new term to the species hitherto generally known as *C. microdon*, and I would suggest, as possessing a fair equivalent in meaning, the word '*minoridens*.'

The species will thus fall into sequence:—

C. microdon Gray (= *chrysalis* Kien.).

C. minoridens Melv. (= *microdon* Auct.).

C. fimbriata Gmel.

(A) *unifasciata* Mighels.

(B) *macula* Ad.

(C) *cholmondeleyi* Melv.

C. irrorata L. (*Naria irrorata* Gray).

N.B.—There is some little confusion as to the usual colour of the produced extremities in *C. chrysalis*. I have seen a specimen shewing lilac suffused with orange, but nine-tenths of the examples that have passed through my hands are pure lilac or pale purple. Worn examples often exhibit a pink tinge of coloration.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

301st Meeting, June 12th, 1901.

Mr. Edward Collier in the chair.

Donations to Library announced and thanks voted:

The usual periodicals received in exchange.

New Member Elected.

Mrs. Charlotte Ellen Gubbins, Westward Ho! N. Devon.

Member Deceased.

Mr. Thomas Rogers.

Discontinuance of Summer Meetings.

It was announced that the Council had decided to discontinue the meetings during July and August, and that a series of out-door rambles had been arranged.

Rambles.

Hope, Derbyshire, July 6th; Marple, Cheshire, July 27th; Guide Bridge and Dukinfield, September 7th.

Paper Read.

Note by the Committee for Collective Investigation.

Exhibits.

By Mr. C. Oldham: *Limax cinereo-niger* var. *maura* from Llanbedrog, Carnarvonshire; *Unio pictorum*, 116 mm. long., Peak Forest Canal, Marple, Cheshire, June, 1895; *Pisidium milium*, *P. fontinale*, *P. pulchellum*, *P. obtusalis*, and *P. pusillum* collected by Mr. R. Welch, in Lough Neagh, Ireland, at a depth of from 66 to 87 feet, June, 1899.

By Mr. R. Cairns: A fine sinistral *Limnæa peregra*, collected by Mr. W. Nelson in a small pond near Leeds.

By Mr. J. E. Cooper: *Segmentina nitida* and *Velletia lacustris* from Broxbourne, Hertfordshire.

By Mr. W. Moss: A series of the *Pleurodonta*, *Dentellaria*, and *Labyrinthus* groups of *Helix*.

By Mr. R. Standen: A remarkable specimen of *Ovula ovum* grooved with numerous regular striæ; *Pedicularia sicula* in situ on coral; and the series of *Pleurodonta* in the Manchester Museum collection.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

Journal de Conchyliologie, vol. 49, nos. 1, 2.

"Description de deux *Unio* et d'un *Corbicula* nouveaux provenant de l'Indo-Chine," by A. BAVAY and PH. DAUTZENBERG [*U. fruhstorferi*, *U. messageri*, *C. messageri*, figd.]. "Note sur le *Voluta (Mamillana) mamilla* Gray," by PH. DAUTZENBERG [adult figured]. "Considérations sur les faunes malacologiques des parties australes du globe," by C. F. ANCEY. "Découverte du *Tympanotomus lignitarum* Eichw. dans le miocène du Bolderberg en Belgique," by G. DOLLFUS and PH. DAUTZENBERG. "Observations sur la faune conchyliologique de l'Annam," by Rev. Père HEUDE [*Unio* 6 spp., *Mycetopus*, *Dipsas*].

"Etude zoologique et anatomique de la *Mitra zonata* Marryatt," by A. VAYS-SIÈRE. "Liste des coquilles recueillies par M. de Gennes à Djibouti et Ali-Sabieh, avec la description de plusieurs formes nouvelles," by H. FISCHER [65 spp., *Marginella gennesi*, *Clanculus gennesi*, *Pinna cochlearis*, nn. spp. figd.]. "Diag-

noses de deux Bulimulidés nouveaux de Pérou," by PH. DAUTZENBERG [*Peronacus baeri*, *P. iocosensis*]. "Etudes sur la faune malacologique des îles Sandwich," by C. F. ANCEY [doubts locality of *Papuina barnaclei*; genus *Philonesia* not separable from *Microcystis*; *Baldwinia* defended]. "Notes critiques et synonymiques sur quelques mollusques," by C. F. ANCEY [*Armandiella* n.n. for *Armandia* præocc.]. "Espèces nouvelles ou peu connues du Mésozoïque Portugais," by P. CHOFFAT [*Terebratulula ribeiroi*].

Annales de la Société Royale Malacologique, de Belgique, vol. 35, 1900.

"Contribution à la Paléontologie de l'éocène belge. Céphalopodes dibranchiaux," by E. VINCENT [*Stenosepia* n. subg., several n. spp.].

"Quelques mots sur les Rhyncholites de l'éocène belge," by E. VINCENT. "Diagnoses de quelques coquilles nouvelles provenant de l'état indépendant du Congo," by P. DUPUIS and DR. PUTZEYS [*Ganomidos* 1, *Perideriopsis* 1, *Melania* 8 nn. spp.]. "Observations sur '*Ostrea inaspecta*' Desh.," by E. VINCENT. "Quelques mots sur les sables à '*Panopea menardi*' d'Anvers et sa banlieue," by Baron VAN ERTBORN. "Description d'une espèce nouvelle de *Goossiensia* (*G. seminuda*) de l'éocène belge," by E. VINCENT. "Compte rendu de l'excursion géologique en Campine les 23, 24 & 25 Septembre, 1900," by M. MOURLON [List of Mollusca collected].

Records of the Australian Museum, vol. 4, no. 3.

"A Revision of the Types of Marine Shells of the Chevert Expedition," by CHARLES HEDLEY [notes and plates 16 and 17].

The Naturalists' Journal, vol. 10, no. 111, Sep., 1901.

"*Clausilia buplicata* at Haselmere, Surrey," and "*Arion subfuscus* in Surrey," by C. PANNELL. "Note on *Limax maximus*," by E. W. SWANTON [devoured specimens of *Agriolimax agrestis*].

The Naturalist, nos. 530-535, March-Aug., 1901.

"Frost and *Limnæa peregra*," by T. PETCH [living under ice]. "*Helcion pellucidum* in Cumberland," by JAMES MURRAY. "*Trochus zizyphinus* var. *lyonsii* on the Yorkshire Coast," by Rev. W. C. HEY. "Albinism in Mollusca at Hubbard's Hill, Louth," by C. S. CARTER [9 spp. recorded]. "North Lincolnshire Slugs," by Rev. E. A. WOODRUFFE-PEACOCK [6 spp.].

"*Helix aspersa* monst. *cornucopia*" and "*Helix aspersa* var. *exalbida*," by Rev. E. A. WOODRUFFE-PEACOCK. "*Acmaea testudinalis* on the Yorkshire coast," by Rev. W. C. HEY. "Thrush-Stones at Cadney, Linc. N.," by Rev. E. A. WOODRUFFE-PEACOCK. "Unusually fine *Planorbis nautilus* at Colton, near Leeds," by W. NELSON. "Molluscan gatherings near Brigg, Linc. N.," by W. BOOTH. "Reversed *Limnæa peregra* in Leeds," by W. NELSON. "On the pairing of *Limax maximus*," by H. WALLIS KEW [abstract of recorded instances with figures]. "*Pisidium milium* at Revesby, Linc.," by C. S. CARTER. "*Helix cantiana*: Its range and soil preferences in North Lincolnshire," by Rev. E. A. WOODRUFFE-PEACOCK.

Le Feuille des Jeunes Naturalistes, nos. 368-371, June-Sep., 1901.

"Contribution à l'étude de la Falaise de Villiers-sur-Mer," by J. RASPAIL. "Liste des coquilles marines recueillies à Cancale," by H. MARTEL [explanation of two plates of abnormalities and varieties].

The Annals of Scottish Natural History, no. 39, July, 1901.

"*Clausilia laminata* [Oakley, Fife] and *Helix virgata* [Kincardine-on-Forth] in the Forth area," by W. EVANS

"**Land and Freshwater Shells**, an introduction to the study of conchology," by J. W. WILLIAMS, with a chapter on the Distribution of the British Land and Freshwater Mollusca, by J. W. TAYLOR.

ADDITIONS TO "BRITISH CONCHOLOGY."

(Continued from vol. 9, page 338).

BY J. T. MARSHALL.

Eulimidæ H. and A. Ad.—The colourless shells of this genus are most difficult to discriminate and to assign to specific limits. The number of whorls in the same species sometimes varies in number, and they nearly all have a way of putting on a pseudo-adult appearance which is misleading. The chief point of specific distinction is in the general contour of their shells, and this requires some experience and a critical eye to determine. One pretty sure guide appears to be the microscopic examination of the tip of the spire or nuclear whorls, but hitherto this has not been generally adopted for want of a system. The Rev. R. Boog Watson, in the "Challenger" Report, seems to have been the first to make practical use of this character in diagnosing the Eulimidæ, and in the many new species which he describes in that Report he has adopted a measurement of the embryonic whorls which is very ingenious and thoroughly practicable. There is a marvellous variation in these embryonic whorls and the extreme tip of the Eulimidæ when viewed microscopically, and conchologists are much indebted to the Rev. R. Boog Watson for reducing this apical form of measurement to a system. The number of new species of the Eulimidæ was a feature of the "Challenger" Expedition, and quite as many were dredged in the "Porcupine" Expedition, a large number of which have yet to be described. With regard to the parasitic or quasi-parasitic habits of *Eulima*, Mr. Watson has found them "constantly, sometimes four or five together, among the spines near the vent of *Echinus esculentus*," and Professor Sars has found *E. philippii* inside *Holothuria intestinalis*.

E. polita L.—Immature specimens of this and *E. intermedia* have the same proportions up to a certain period of growth, but the upper whorls in *E. polita* are usually pinched in, the profile of the spire being thus slightly concave instead of regularly conical. The embryonic whorls are also similar, but both vary in sharpness; they can be seen in the young only, the apex being seldom or never present in the adult. A dwarf form, from Guernsey and the Minch, does not exceed half-an-inch in length, the size of adult *E. intermedia*; but the latter has a smaller mouth and is not so callous on the pillar.

E. intermedia Cant.—20 to 90 fathoms. Scilly Islands, Penzance, Torbay, Connemara, Bantry Bay, and off Glenelg 90 f. Also in the Shetland-Færoe Channel, 570 f. (Triton)!

Var. **rubrotincta** Jeffr.—Scilly Islands, 40 f. (Burkill and J.T.M.); Land's End; off Fermain Bay, Guernsey, 12—18 f.; Berehaven; Lamlash, 12 f.; Arran, 25 f.; Loch Broom, 20 f.; the Minch, 20—30 f.; Vidlin Voe and Hascosey Sound, E. Shetlands, 8—10 f.

This species is "extremely variable in size, length of spire, comparative slenderness and breadth of the last whorl, as well as in a slight degree of curvature."¹ My largest, from Guernsey, are six lines by one, and the smallest, from Scilly and Guernsey, do not exceed a line in length. Every degree of variation in the proportions of length and breadth will be found between these two extremes. Immature specimens are angulated at the base, making the outline an elongated cone, while adults are fusiform or spindle-shaped. It differs from *E. philippii* in having a proportionally smaller and shorter aperture, and in the apex not being suddenly narrowed at the tip. The var. *rubrotincta* is scarce. It resembles a large *E. philippii* var. *gracilis*, and is erroneously figured as the latter in "British Mollusca." It is half the usual *width* of the type (not half the *size*), and both have 10—12 whorls. It varies in size to as great extremes as the type, and specimens equal to *E. philippii* var. *gracilis* are very difficult to separate—in most Hebridean collections the two are mixed—but when placed side by side it will be found that this variety has a more attenuated spire, flatter whorls, the mouth longer and narrower and not projecting beyond the profile-lines of the shell, while the base is less swollen and more compressed, resembling that of *E. subulata*. The embryos of both are similar, and are invariably curved, while adult specimens of var. *rubrotincta* are either straight, curved, or flexuous. The pinkish colour of the upper whorls is of little account as a character, many of the *Eulimidæ*, when fresh, having similar stains. This species and the next, with their varieties, were imperfectly and incorrectly described by Gwyn Jeffreys, and their determination has been further obscured by Forbes and Hanley figuring one shell for another.

Professor Dall states that the form figured and described by Jeffreys is the exotic *E. oleacea* of Kurtz and Simpson (1851); while the Marquis di Monterosato² who has "a great repugnance to identify the shells of European with more distant seas," substitutes the name of *E. lubrica* for the European species, on the grounds that Cantraine gave neither figure nor reference nor locality for his *E. intermedia*. Unfortunately, Cantraine's type is irretrievably lost, but it has come to be regarded by writers, without much questioning, as this species. *E. opalina* Monts. appears to differ from this in outline only, the base being somewhat broader.

Jeffreys' figure is the only good one I know; Forbes and Hanley's, as well as Searles Wood's, are too conical, or broad at the base, representing immature shells.

E. petitiana Brus.—New to Britain. Several specimens from the

¹ Jeffreys, "Moll. 'Lightning' and 'Porcupine,'" *Proc. Zool. Soc.*, p. 367, 1884.

² "Conch. Profond. di Palermo," p. 14.

Menavawr Dock, off the Scillies, in 38 fathoms. This is nearest a dwarf form of *E. intermedia*, from which it differs in being much more solid, the base more produced, the periphery obtusely angulated, the mouth smaller, the whorls convex instead of compressed, the suture more deeply defined, and the whole shell forming a slight curve. My largest are 1.5 lines by 0.75, and the smallest 1 line by 0.5. I have dwarfs of *E. intermedia* equally small, from the same district and elsewhere, but they differ in all the above characters.

I have received this from foreign correspondents as *E. brevis* Req., and under the same name I have also received, from the same sources, dwarfs of *E. polita* and *E. intermedia*. There is considerable doubt as to the identity of *E. brevis*, and as to whether it is a valid species; but all I can say, from the specimens before me, is that *E. petitiuna* Brus. is identical with the Scillonian shell, and that it bears the same relation to *E. intermedia* as *E. brevis* does to *E. polita*.

E. anceps Marshall n.sp.—Shell cylindro-conical, solid, transparent, and glossy; sculpture none; colour glassy-white (a dead specimen is ivory-white); spire long and tapering; the upper half has a slight curve and is nearly cylindrical, while the lower half more rapidly increases, thus making the profile lines slightly concave in the centre; the first whorl is semi-globular and blunt, like *E. stenostoma*, the second and third are convex, the following ones compressed, and the last is comparatively large, convex, and obtusely keeled round the periphery; suture very slight and oblique, but well defined by the septum of the preceding whorls; mouth pear-shaped, small (about one-third the length of the shell); outer lip thickened, deeply sinuated where joined to the pillar, convex and projecting in the centre, and expanded at the base; inner lip also thickened, especially below the pillar, to which it is attached with very little callosity. L. 0.2 in., b. 0.05.

Off Arran, in 31 fathoms, with *E. ephamilla*; three specimens. I have also two examples from the Adventure Bank, dredged by the "Porcupine," and I detected another among some specimens of *E. intermedia* received from the Marquis di Monterosato, who writes me that he has dredged the same species at Palermo.

This differs from other British species in the broad blunted apex; if found without the top whorls, it would probably be assigned to *E. intermedia*, from which it further differs in the attenuated spire; it is nearest in outline to the var. *rubroincta*, but *E. anceps* has the last whorl larger and convex, with the mouth projecting. It has some resemblance to *E. solida* Jeffr., but that species is more cylindrical throughout, has a still larger bulbous apex, and an angular base. It also has some of the features of *E. acerrima* Wats., but the latter has more whorls (12), a pointed apex, and a different mouth. An unde-

scribed species from the Portugal coast, dredged by the "Porcupine," has a still closer affinity with this shell, but the mouth is different.

E. curva Monts. (*J. Conch.*, vol. 7, pp. 381-2, 1894).—Guernsey, Scilly, and Land's End. Distribution—Adriatic, Marseilles, Sardinia, Naples, Palermo, and Algeria (Monterosato). According to Professor Dall, this is *E. arcuata* C. Ad., an exotic species of anterior date.

After a personal examination of *E. latipes* Watson in the National Collections, I still consider that species very closely allied to, if not identical with, this one. One of my specimens has an angulated base, another has the spire nearly straight, and the discovery of further examples discloses a considerable amount of variation. All the specimens from Guernsey, and a few from Scilly, belong to a much smaller form, agreeing in size and proportions with an extreme form of *E. philippii* to be noticed from Guernsey, Scilly, and the west of Ireland, and the two can easily be confused; but in *E. curva* the apical whorls have a sudden twist like a partial dislocation, the whorls are less compressed, and the sutural lines more deeply cut.

E. philippii Weink.—This and *E. intermedia* run into an amazing number of forms, and have served as the groundwork for many so-called species and varieties. No one who is not conversant with the two species can imagine their manifold variations in size and shape, and the difficulty of assigning them to their true limits. The species consists in the main of two principal forms—the one being a line in length, with whorls slightly convex, well-defined sutural lines, a broad and rounded base, the spire bending rather abruptly near the apex, which is blunt, and with a contracted mouth not projecting beyond the outline of the spire. It is the normal form in the Channel and Scilly Islands, the south of England, and west of Ireland. It has some affinity to *E. nana* Monts. (which Gwyn Jeffreys by mistake has mixed up with it in the "Porcupine" records), and extreme examples of it approximate to *E. curva*. The other form is a line and a half in length, gracefully curved and tapering, whorls flattened, the apical one suddenly contracting to a pointed tip, the aperture larger, patulous, and projecting, and the base more or less angulated. This is from the north of England, the Hebrides, and Shetlands, but is also occasionally found in the south. It differs in all its characters from the southern one, more so than in many acknowledged species of *Eulima*, but the intermediate forms are so numerous and diversified as to make it impossible to draw a line between them, and the two forms very probably indicate different habitats. None of the published figures in my opinion represent either of them accurately, but Forbes and Hanley's are the best, and represent the northern or slender form; Gwyn Jeffreys' has the spire too attenuated and the suture too sloping. The latter author has defined the various forms thus—"Some speci-

mens have the last whorl larger in proportion to the next, or else have the outer lip more or less flexuous; the degree of curvature (which is occasionally double or flexuous) differs considerably, and the periphery is now and then somewhat angulated or keeled."¹ The Marquis di Monterosato² adopts our southern form as the type, which he says is *Helix incurva* Renier (1804). Gwyn Jeffreys gives the length of *E. philippii* as two lines, and the whorls as 10-15,³ but an example of that length would be a *rara avis* indeed, and none exceed 11 whorls. It is not always curved; straight specimens occur in the proportion of five per cent., but from the Doggerbank two-thirds of the specimens are straight.

Var. **gracilis** F. & H.—Larger, broader throughout, apex blunt; whorls 10, as type; length varying from 1.25 to 2.25 lines. Although scarce, this is not nearly so limited in range as Jeffreys indicates. I have specimens in my cabinet from all the undermentioned places—Guernsey, 18 f.; Scilly, 35 f.; Land's End; Berehaven and Bantry Bay; throughout the Clyde; Mull of Cantire, 24 f.; the Minch, 20—50 f.; Dornoch Frith; and solitary specimens from various other parts of the Hebrides. This is very true to form, but variable in size, some specimens being only half that of others. It is apparently straight, but there is frequently an indication of flexuousness about the upper part of the spire. It has the proportions of *E. bilineata* of the same size, the apex is blunt, and the periphery is never angulated except when immature. Gwyn Jeffreys sums it up as follows:—"The var. *gracilis* is usually straight instead of being distorted or curved, but after a long and close examination I have failed in discovering a single character which would justify its separation from the typical form as a distinct species."⁴ Still, it is such a distinct form in itself, and its general aspect so marked from the type, that I should not demur to any one treating it as a good species; and as a matter of fact Continental writers do so treat it. At the same time, it must be remembered that intermediate forms will often occur to the dredger, and that no one can say where *E. philippii* ends and var. *gracilis* begins. The habitat of *E. philippii* is not clearly known; it may have two or three; but this variety, at least on our coasts, appears to live free on the bed of the sea in muddy sand, while the type has been observed as quasi-parasitic on other organisms, and I have found it occasionally in the delicate sea-weeds of rock-pools. The figure in "British Mollusca" is much too long and slender for this variety, and the authors describe it as "much more slender" than the type, and the size as "one-third of an inch," characters which are inapplicable to this variety, but

1 "Moll. 'Lightning' and 'Porcupine,'" *Proc. Zool. Soc.*, p. 367, 1884.

2 "Nomen. Gen. e Sp.," p. 101, 1884.

3 "Brit. Conch.," vol. 4, p. 205.

4 "Moll. 'Lightning' and 'Porcupine,'" *Proc. Zool. Soc.*, p. 367, 1884.

which accord with what their figure was drawn from, *E. intermedia* var. *rubrotincta* ; the largest specimens of *E. gracilis* do not exceed a quarter-inch in length. No doubt the authors of "British Mollusca," in describing what they called "the Clyde variety," knew what their type-form was, but in their endeavour to choose a fine example for their purpose they unfortunately adopted a different species. *E. comatulicola* Graff (= *E. beryllina* Monts.) I consider a form of var. *gracilis* ; the shape of the mouth is certainly peculiar, but it is shared with other forms (I have specimens both of the type and var. *gracilis* with the same peculiarity), and it will be found that even in undoubted typical specimens, gathered from the same locality, the formation of the aperture in this species is individually variable. *E. comatulicola* is recorded as being "abundant in the Gulf of Naples on *Comatula mediterranea*" (Graff).

Var. **monterosatoi** (Monts., Conch. prof. Palermo, p. 14, as *E. monterosatoi*).—New to Britain. Guernsey, 18 f. ; Scilly, 35 f. ; Caldy Island ; Bantry Bay ; Portrush, 20 f. ; Clyde mouth, 18 f. "A small form, rather solid, glossy, some of the whorls slightly flexuous ; from Palermo, Naples, and Soulac" (Monterosato). I do not consider this more than an extreme form of *E. philippii*, as I have intermediate specimens from Guernsey and Scilly, and I can find no perceptible difference in the apex or mouth. It differs from *E. philippii* in being almost straight, proportionally broader at the base, and more conical, with the spire shorter and the last whorl larger, though there are several forms of it ; the British one is like a stumpy var. *gracilis* nearest the form called *E. comatulicola* Graff, mentioned above.

E. antiflexa (= *E. philippii* var. *exilis*) Monts., which I do not regard as more than a dwarf form of *E. philippii*, occurs at Guernsey, Scilly, the Land's End, and the west of Ireland ; while his *E. devians* (a good variety) was dredged on the Channel slope in the "Porcupine" Expedition of 1870, in 690 f. This latter has the combined characters of the type and var. *gracilis*—large and coarse, flexuous, with a coarse and blunted apex.

E. perminima Jeffr.—I have a shell from off the Menavawr, in the Scilly Islands, which I ascribe to this species, though with some doubt, as Gwyn Jeffreys has not made his diagnosis clear. It has all the characters given by the author to *E. perminima*, except that it is somewhat larger ; but it does not, any more than his short description, agree with his figure. Not only do I believe that figure to be incorrectly drawn, but the dimensions given (0.05 in. by 0.03) would not suit a shell "proportionately narrower" than *E. philippii*, nor correspond to the proportions of his figure. My shell is 0.08 in. by 0.03, and for the present I must allocate it to this species. (See also *J. Conch.*, vol. 7, p. 256, 1893).

E. stenostoma Jeffr.—Atlantic off Scilly, 690 f. ("Porcupine")! Shetland-Færø Channel, 570 f. ("Triton")!

Jeffreys' figure of this shell is an excellent one; that of Sowerby has the last whorl much too large and angular, and the apex should be truncated instead of pointed. Though a Norwegian species, Sars' figure is altogether unlike, being drawn too much out of scale; the last whorl should be much longer (about half the length of the shell) and the spire shorter. There is a great difference in these three figures.

E. ephamilla Wats. (*J. Conch.*, vol. 6, pp. 260-2, 1890).—Besides the six localities I have given in the foregoing reference, I detected some living specimens among the dredgings of the Royal Irish Academy Cruise of 1886, from Berehaven, S.W. Ireland, in 20 faths.; and also another example in Mr. Jordan's collection among some *E. philippii* var. *gracilis*, labelled "Hebrides." This species is not always straight; two of my specimens are slightly curved, and another has the tip only of the spire curved.

E. subulata Don.—Liverpool and Morecambe Bays; Doggerbank, 30 f., a single specimen. I believe these, with the Isle of Man, to be the most northern limits for this species, and that the Orkney and Shetland localities should be ascribed to the next. A short broad form has the same dimensions as *E. bilineata*, but retains its own characters. The young are slightly angulated at the base. "Of the numerous synonyms, *glaber* of Da Costa is prior to *subulata* and every other, but the present name has been sanctioned by use."¹ It is not quite certain, however, that this is the *Eulima* which Da Costa indubitably meant to name *glaber*.

E. bilineata Alder.—Not so local as the last species. It varies greatly in size and relative proportions, but the adult stage may always be known by the last whorl being disproportionally swollen, and the base of the aperture open, rounded, and thickened. Immature specimens are more or less angulated and pointed at the base. It is occasionally bent at the tip, and one from Scilly is curved. Specimens from Thurso and the Orkneys are remarkably slender, more so than *E. subulata*. From the latter species, this differs in being only half the size, with a broader base, the whorls are not so compressed, the suture is deeper, and the mouth projects beyond the profile lines of the spire, whereas in *E. subulata* the outer lip is continuous in outline with the spire, and the base is lengthened out. In fresh specimens the difference in the coloured bands will always serve to distinguish the two, or when the apex is perfect a sure guide is indicated in the first three whorls, which are convex instead of compressed. The largest come from Guernsey and Torbay, and attain four lines by one.

1 Jeffreys, "Moll. 'Lightning' and 'Porcupine,'" *Proc. Zool. Soc.*, p. 365, 1884.

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OF THE

CONCHOLOGICAL SOCIETY

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- 2.—Its object shall be the promotion of the science of Conchology, by the holding of Meetings for the reading and discussion of original papers, by the publication of proceedings, and by the formation of a Library and Collections illustrative of the science.
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- 9.—The meetings shall be held monthly, at the time and place fixed by the Council, who shall also have power to arrange such additional meetings as they may think desirable.
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- 11.—The Annual Meeting shall be held at such time and place as may be fixed at the previous Annual Meeting, to receive the Reports and Balance Sheet of the out-going Council, and to elect a Council and Officers for the ensuing year.

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LIST OF MEMBERS.

Corrected to Dec. 11, 1901.

(With year of election; O = founder, or original member; L = Life Member
*post packets have been returned undelivered).

HONORARY MEMBERS

(Limited to ten in number).

1889. Bergh, Prof. Dr. Rudolph, Vestregade, Copenhagen.
1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
1889. Cossmann, Maurice, Ingénieur-chef des services techniques du chemin de fer du nord, 95, Rue de Maubeuge, Paris.
1897. Dall, Wm. Healey, Smithsonian Institution, Washington, U.S.A.
1878. Kobelt, Dr. Wilhelm, Schwanheim, Frankfurt-am-Main.
1886. Martens, Dr. Eduard von, C.M.Z.S., Paulstrasse, Berlin, N. W.
- O Nelson, William, Gandy Row, Crossgates, Leeds.
1889. Philippi, Dr. R. A., Director del Museo Nacional, Santiago, Chile.
1889. Sars, Prof. G. O., Universitet, Christiania, Norway.
1889. Simroth, Dr. Heinrich Rudolph, Fichtestrasse 15, I., Leipzig.

ORDINARY MEMBERS.

1885. Adams, Lionel Ernest, B.A., 68, Wolverhampton Road, Stafford.
 1899. Appleton, Thos. Alf., M.R.C.S., 46, Britannia Rd., Fulham, London, S.W.
 1895. Arnold, Bernard, F.L.S., Milton Lodge, Gravesend, Kent.
1886. Baillie, William, Brora, near Golspie, Sutherlandshire.
 1897. Baldwin, D. D., M.A., Haiker, Maui, Hawaiian Islands.
 1899. Baldwin, Joseph W., Darwen Road, Dunscar, near Bolton, Lancs.
 1895. Barker, Reginald Hawksworth, Grosvenor Bank, Scarborough.
 1886. Barnacle, Rev. H. Glanville, M.A., F.R.A.S., St. John's College, Grimsargh, Preston, Lancs.
1897. Barrett, Chas. Golding, F.E.S., Tremont, Peckham Rye, London, S.E.
 1897. Beddome, Charles Edward, Hillgrove, near Hobart, Tasmania.
 1901. Beeston, Harry, Hawkestone, Havant, Hants.
 1886. Bendall, Wilfrid, 77, Baker Street, Portman Square, London, W.
 1901. Bentley, R. H., 43, Gloucester Road, Brownswood Park, London, N.
 1901. Birley, Miss Caroline, 14, Brunswick Gardens, Kensington, London, W.
 1897. Blackburn, Rev. Ed. Percy, 31, New Road, Driffield, Yorks.
 1897. Blackmore, Jas. Chanter, F.G.S., Falkirk, Chatley Road, Clifton, Bristol.
 1899. Blackshaw, James C., 158, Penn Road, Wolverhampton.
 1899. Bladen, W. Wells, Stone, Staffordshire.
 1897. Blake, Wm. Charles, 2, Acacia Villas, Ross, Herefordshire.
 1895. Bles, Edward J., B.Sc., Newnham Lea, Cambridge.
 1897. Bliss, Joseph, Smyrna, Asia Minor.
 1899. Blundell, Mrs. Jessie M., Argyll House, Cirencester.
 1897. Bolton, Herbert, F.R.S.E., Museum, Bristol.
 1895. Booth, George Albert, F.E.S., Fern Hill, Grange-over-Sands, Lancs.
 1884. Bostock, Edwin D., Tixall Lodge, Tixall, Stafford.
1897. *L* Boycott, Arthur Edwin, The Grange, Hereford,
 1896. Brass, John George, The Grove, Barnard Castle, Durham.
 1879. Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill Street, Sydney, N.S.W.
1893. Brierley, Mrs. H. G., Glen View, Gledholt, Huddersfield.
 1900. Broadbent, Dr. G. H., 8, Ardwick Green, Manchester.
 1899. Brooksbank, Hugh, M.B., College Road, Windermere.
 1901. Brown, W. D., Woodlands, Parbold, nr. Southport.
 1901. Brown, Lewis B., P.O. Box 148, Bridgetown, Barbadoes, W. Indies.
 1901. Browne, A. J. Jukes, F.G.S., Etruria, Kent's Road, Torquay.
 1897. *L* Bullen, Rev. Robert Ashington, B.A., F.L.S., etc., Pyrford Vicarage, Woking, Surrey.
1896. Burgess, Wm. Valentine, 9, York Road, Chorlton-cum-Hardy, Manchester.
 1897. Burnup, Henry Clifden, Jesmond, Pietermaritzburg, Natal.
 1901. Bury, Miss E. P. F., 77, Elm Park Mansions, Park Walk, Chelsea, London, S.W.
1879. Butterell, J. Darker, Manor House, Wansford, Hull.
 1888. Byne, Loftus St. George, M.Sc., c/o W. G. Marshall, Esq., Morton Manor, near Taunton.
1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne, Lancs.
 1893. Carphin, Mrs. Janet, 7, Lockerbie Cottages, Liberton, Edinburgh.
 1901. Carter, (has. S., 172, Eastgate, Louth, Lincs.
 1878. Cash, William, F.G.S., F.R.M.S., 35, Commercial Street, Halifax.
 1901. Chadwick, William H., 63, Hornsey Rise, London, N.

1892. Champ, Hy., c/o S. & J. Watts & Co., Portland Street, Manchester.
 1895. Chaster, George Wm., M.R.C.S., 42, Talbot Street, Southport, Lancs.
 1887. Chaytor, R. C., Scafton Lodge, Middleham, Bedale, Yorks.
 1889. Christy, Robert Miller, F.L.S., Pryors, Broomfield, nr. Chelmsford, Essex.
 1898. Clifton, Francis R., 24, Park Street, Stoke Newington, London, N.
 1886. Coates, Henry, F.R.S.E., Pitcullen House, Perth.
 1880. Collier, Edwd., Glen Esk, Whalley Range, Manchester.
 1898. Collinge, Walter Ed., F.Z.S., University, Birmingham.
 1897. Cook, Rev. Thomas, Whinwood, Westcliff Grove, Harrogate.
 1901. Cooke, Rev. Alfred H., M.A., Aldenham School, Elstree, Herts.
 1892. Cooper, James Eddowes, 68, North Hill, London, N.
 1901. Cox, Jas. C., M.D., F.L.S., Sydney, N. S. Wales.
 1895. Corker, Jas. S., 59, Darncombe Street, Moss Side, Manchester.
 1899. Crampton, C. B., M.B., Geological Survey Offices, Sheriff Court Buildings, Edinburgh.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1886. Crick, Walter D., Nine Springs, Cliftonville, Northampton.
 1888. Crouch, Walter, F.Z.S., Grafton House, Wellesley Road, Wanstead, Essex.
 1899. Crowther, J. E., Portland Street, Elland, Yorks.
1886. DaCosta, Solomon I., 2, Craven Hill, London, W.
 1897. Dacie, John Charles, 14, Montserrat Road, Putney, London, S.W.
 1893. Daniel, A. T., M.A., Richmond Terrace, Shelton, Stoke-on-Trent.
 1886. Darbishire, Robert D., Victoria Park, Manchester.
 1899. Darnbrough, Frederick, Croft Villa, Eaglescliffe, Yarm-on-Tees.
 1897. Dautzenberg, Ph., 213, Rue de l' Université, Paris.
 1889. Dawson, Oswald, Seacroft, Leeds; and Albion Walk Chambers, Leeds.
 1898. Dean, John D., 2, Clarendon Road, Whalley Range, Manchester.
 1892. Dixon, James Bassett, Ribblesdale House, Preston, Lancs.
 1901. Drummond, Robt., 20, Upper Talbot Street, Blackpool.
 1901. Dyson, W. O., 41, Whiteley Street, Oldham.
1892. Eccles, John Christopher, 20, Winckley Square, Preston, Lancs.
 1895. Edwards, J. Sumner, 6, Woodland Grove, Chapeltown Road, Leeds.
 1895. Edwards, Thos., Cliftonville House, Equity Rd., Narborough Rd, Leicester.
 1901. Edwards, W. J., 96, Palmerston Street, Moss Side, Manchester.
 1901. Edwards, W. H., Hastings Museum, Victoria Institute, Worcester.
 1891. Elgar, Hubert, 3, St. Michael's Terrace, Fant Road, Maidstone, Kent.
 1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.
 1901. Ensor, A. R., 60, Lumley Road, Skegness, Lincolnshire.
 1888. Evans, Mrs. A., sen., Brimscombe Court, Thrupp, near Stroud, Gloucestershire.
 1894. Evans, Wm., F.R.S.E., 18A, Morningside Park, Edinburgh.
 1886. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
1891. Farrer, Captain Wm. James, Chapel House, Bassenthwaite, Keswick.
 1897. Farquhar, John, 3, Rose Terrace, African Str., Grahamstown, Cape Colony.
 1897. Fielding, Clement, M.P.S., Clover Hill, Halifax, Yorks.
 1890. Fierke, Frederick Wm., 73, Redbourne Street, Hull.
 1884. Fitzgerald, Rev. H. Purefoy, Wellington College, Berks.
 1886. Fitzgerald, Mrs. J., Kapai, Maidstone Road, Headcorn, Kent.
 1898. Fitzsimons, J. B., M.D., 14, Owen Street, Hereford.
 1892. Fulton, Hugh, 15, Station Parade, Kew Gardens, London, W.

1895. Gamble, Frederick Wm., D.Sc.(Vict.), Owens College, Manchester.
 1889. Gaskell, Roger, M.A., 5, The Grove, Highgate, London, N.
 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., etc., Meadow Bank, Accrington
 1898. Glover, Miss Maria, 124, Manchester Road, Southport, Lancs.
 1886. Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1897. Godwin-Austen, H. H., Lt.-Col., F.R.S., etc., Nore, Godalming, Surrey.
 1901. Gould, Mrs. Nutcombe, 17, Dorchester Road, Weymouth, Dorset.
 1886. Greene, Rev. Carleton, M.A., Gt. Barford Vicarage, St. Neots, Huntingdon.
 1901. Gubbins, Mrs., Westwood Ho!, N. Devon.
 1890. Gude, G. K., F.Z.S., 114, Adelaide Road, Hampstead, London, N.W.
 1886. Gwatkin, Rev. Prof. H. M., LL.D., M.A., 8, Scrope Terrace, Cambridge.
 1897. Hall, Thos. Bird, Larch Wood, Rock Ferry, Cheshire.
 1895. Hann, Rev. Adam, 100, Union Street, Willenhall, Staffordshire.
 1895. Hardy, John Ray, Manchester Museum, Owens College, Manchester.
 1895. Hardy, John, 11, Stockton Road, Chorlton-cum-Hardy, near Manchester.
 1887. Hargreaves, J. A., 3, Ramshill Road, Scarborough, Yorks.
 1897. Harrison, Miss G. M., 14, Queen's Road, Southport, Lancs.
 1889. Hartley, Alfred, 19, Thorpe Garth, Idle, near Bradford, Yorks.
 1887. Harvard, T. Mawson, 23, Northbrook Road, Lee, London, S.E.
 1891. Hawell, Rev. John, M.A., Vicarage, Ingleby Greenhow, Middlesborough.
 1887. Heathcote, Wm. Henry, F.L.S., 19a, Fishergate, Preston, Lancs.
 1896. Herdman, Prof. W. A., D.Sc., F.R.S., University College, Liverpool.
 1887. Hey, Thomas, 8, Bloomfield Street, Derby.
 1895. Hibbert, Charles R. C., Riccard's Down, Abbotsham, Bideford, Devon.
 1895. Hickson, Prof. Sydney J., D.Sc., M.A., F.R.S., Owens College, Manchester.
 1893. Hill, John, Little Eaton, near Derby.
 1886. Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.
 1891. Horsley, Rev. J. W., St. Peter's Rectory, Walworth, London, S.E.
 1884. Howell, George O., 210, Eglinton Road, Plumstead, Kent.
 1892. Howorth, Sir Henry Hoyle, K.C.I.E., M.P., F.R.S., etc., 30, Collingham Gardens, London, S.W.
 1886. Hoyle, W. E., M.A., Director of the Manchester Museum, Owens College, Manchester.
 1895. Hudson, Rev. Hy. A., 445, Stretford Road, Manchester.
 1901. Jackson, J. W., 18, Bedford Avenue, Manley Park, Manchester.
 1886. James, John H., A.R.I.Cornwall, 3, Truro Veau Terrace, Truro.
 1891. Jenner, James Herbert Augustus, F.E.S., 209, School Hill, Lewes, Sussex.
 1901. Johnson, W. H., 97, Rumford Street, Chorlton-on-Medlock, Manchester.
 1894. Jones, Kenneth Hurlstone, M.B., R.N., H.M.S. "Waterwitch," China Station, Shanghai.
 1888. Jones, Wm. Jas., jun., 76, Mayes Road, Woodgreen, London, N.
 1889. Jordan, H. K., F.G.S., The Knoll, Clytha Park, Newport, Monmouthshire.
 1897. Kendig, Rev. Amos B., D.D., 86, Vernon Str., Brookline, Mass., U.S.A.
 1897. Kennard, A. S., Benenden, Mackenzie Road, Beckenham, Kent.
 1902. Kensett, Percy F., Holmesdale, Harewood Road, Merton, London, S.W.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne, Victoria.
 1887. Kew, H. Wallis, F.Z.S., 157, Ferme Park Road, Hornsey, London, N.
 1900. Killingbeck, J. H., Llwyn On, Abbey Place, Llangollen, N. Wales.

1889. Knight, Rev. G. A. Frank, M.A., St. Andrew's Manse, Auchterarder, Perthshire.
1901. Laidlaw, F. F., B.A., Owens College, Manchester.
1899. Lancaster, Ernest Le Cronier, B.A., M.B., Winchester House, Swansea, S. Wales.
1879. Laver, Henry, M.R.C.S., F.L.S., Head Street, Colchester, Essex.
1894. Lawson, Peter, 11, The Broadway, Walham Green, London, S.W.
1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
1878. Leicester, Alfred, The Mount, Aston Clinton, Bucks.
1899. Lightfoot, Robert M., South African Museum, Cape Town.
1896. Linton, John, 25, Wordsworth Road, Smallheath, Birmingham.
1897. Lodder, Miss Mary, Bank of Australasia, Launceston, Tasmania.
1895. Loydell, A., 36, Milton Road, Acton, London, W.
1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich, Cheshire.
1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire, S. Wales.
1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire.
1885. McKean, Kenneth, F.L.S., Lloyds, London, E.C.
1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
1884. Madison, James, 167, Bradford Street, Birmingham.
1899. Mansel-Pleydell, J. C., B.A., F.L.S., etc., Whatcombe, Dorset.
1885. Marquand, Ernest D., Belle Vue, Alderney.
1887. Marshall, J. T., Sevenoaks, Torquay, Devonshire.
1887. Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
1899. Mason, G. Edward, 11B, Stanford Place, Stanley Bridge, Fulham, London, S.W.
1888. Mason, Philip Brooke, J.P., M.R.C.S., F.L.S., etc., Trent House, Burton-on-Trent.
1897. May, William Lewis, F.R.S. Tasm., Forest Hill, Sandford, Tasmania.
1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
1880. Melvill, James Cosmo, M.A., F.L.S., Brook House, Prestwich, Manchester.
1891. Middleton, Robert, Gledhow, near Leeds.
1888. Milne, J. Grafton, Holly House, Plaistow, London, E.
1879. Milnes, Rev. Herbert, M.A., Berkeley Villa, Berkeley St., Cheltenham.
1891. Mitchell, James, 240, Darnley Street, Pollokshields, Glasgow.
1891. Morris, Cecil Herbert, Lewes, Sussex.
1899. Morris, G. M., 18, Northen Grove, W. Didsbury, Manchester.
1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
1899. Neild, J. E., Gilda Brook Road, Eccles, near Manchester.
1887. Newstead, A. H. L., B.A., Rose Villa, Prospect Road, Snakes Lane, Woodford Green, Essex.
1891. Newton, Richard Bullen, F.G.S., 7, Melrose Gardens, West Kensington Park, London, W.
1891. Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., etc., The Red House, Berkhamstead.
1901. Norton, Miss E. M., Rosslyn, Westbury-on-Trym, near Bristol.
1901. Oelrichs, W., 3, Wexford Road, Oxton, Cheshire.
1887. Oldham, Charles, Brook Cottage, Knutsford, Cheshire.
1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
1896. Overton, Harry, Ingleside, Clifton Road, Sutton Coldfield, Warwickshire.
1900. Pannell, Chas., jr., East Street, Haslemere, Surrey.
1882. Parke, George H., F.L.S., etc., St. John's, Wakefield, Yorks.

1887. Parry, Lieut.-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
 1898. Partridge, F. J., 75, High Street, Barnstaple, N. Devon.
 1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock, Oxfordshire.
 1901. Penrose, G., Royal Institution of Cornwall, Truro.
 1896. Percival, A. Blayney, Somerset Court, Brent Knoll, Somerset.
 1896. Phillips, Robert Albert, Ashburton, Cork.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1898. Poore, Arthur S., Heather View, West Heath Road, Bostall Heath, Abbey Wood, Kent.
 1895. Powell, Mrs. A., Nant-y-Velin, Criccieth, N. Wales.
 1897. Preston, Hugh Berthon, F.Z.S., 3, Sydney Terrace, Fulham Road, London, S.W.
 1896. Ragdale, John Rowland, The Beeches, Whitefield, near Manchester.
 1899. Ramanan, Vedaraniyam Venkata, M.A., 20, Sami Pillay Street, Triplicane, Madras.
 1896. Rhodes, John, F.E.S., 360, Blackburn Road, Accrington, Lancs.
 1900. Richards, C. P., Mission House, Stenalees, St. Austell, Cornwall.
 1898. Roberts, A. William Rymer, The Common, Windermere.
 O Roebuck, Wm. Denison, F.L.S., 259, Hyde Park Road, Leeds.
 1901. Rooth, J. A., Radcliffe Infirmary, Oxford.
 1893. Roseburgh, John, Market Square, Galashiels, Roxburgh.
 1892. Rosevear, John Burman, 109, New King's Rd., Fulham, London, S.W.
 1877. Scharff, Robert F., Ph.D., M.R.I.A., Tudor House, Dundrum, Dublin.
 1895. Schill, C. H., Broome House, Didsbury, near Manchester.
 1886. Scott, Thomas, F.L.S., 3, Menzies Road, Torry, Aberdeen.
 1893. Shackelford, Rev. Lewis John, 16, Pimlico Road, Clitheroe, Lancs.
 1892. Shillito, John G., 20, Elmore Road, Sheffield.
 1895. Sich, Alfred, F.E.S., Brentwood, 65, Barrowgate Rd., Chiswick, London, W
 1896. Sidebotham, Dr. E. J., Erlesdene, Bowdon, Cheshire.
 1884. Skilton, Mrs. Mary, 21, London Road, Brentford, Middlesex.
 1886. Smart, Rev. R. W. J., M.A., Parkham Rectory, Bideford, N. Devon.
 1886. Smith, Edgar A., F.Z.S., Natural History Museum, Cromwell Road, London, S.W.
 1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth St., Topsham, Exeter.
 1899. L Smith, Mrs. Lucy A., Cricklade Street, Cirencester.
 1894. Smith, Wm. Chas., 7, Vanston Place, Walham Green, London, S.W.
 1896. Smith, Wm. Rayson, Harleston, Norfolk.
 1900. Solly, E. H., 3, South Street, Deal, Kent.
 1886. L Somerville, Alexander, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow
 1887. Somerville, Rev. James E., M.A., B.D., Castellar, Crieff, N.B.
 1886. Sowerby, Geo. Brettingham, F.L.S., 15, Station Parade, Kew Gardens, London, W.
 1892. Span, Bartlet, Woodlands, Tenby, South Wales.
 1896. Sparkes, Thomas, 92, Heywood Street, Moss Side, Manchester.
 1900. Stacey, John, 22, Nithdale Road, Plumstead, Kent.
 1886. Standen, Robert, 113, Sewerby Street, Alexandra Park, Manchester.
 1888. Stanley, Frederick, Rokeby, Edgar Road, Margate, Kent.
 1888. Stirrup, Mark, F.G.S., High Thorn, Bowdon, Cheshire.
 1896. Stonestreet, Rev. W. T., 12, Wellington St., Higher Broughton, Manchester.
 1885. L Storey, J. A., B.A., St. Joseph's High School, Cardiff.

1897. Stracey, Bernard, M.B., Crichton Royal Institute, Dumfries.
 1890. Stubbs, Arthur Goodwin, Staincliffe, Granville Road, Eastbourne.
 1893. Stump, Edward Consterdine, 16, Herbert St., Moss Side, Manchester.
 1899. Sturt, W. Neville, India Office, Westminster, London, S.W.
 1895. Swanton, E. W., The Educational Museum, Haslemere, Surrey.
 1888. Sykes, Ernest Ruthven, B.A., F.L.S., etc., 3, Gray's Inn Place, Gray's Inn, London, E.C.
 1895. Sykes, Robert Dardsley, Lostock Hall, near Preston, Lancs.
 1895. Taylor, Frederick, 38, Landseer Street, Park Road, Oldham, Lancs.
 1897. Taylor, Rev. George W., F.R.S. Canada, etc., 70, Irwin Street, Nanaimo, British Columbia.
 O Taylor, John W., F.L.S., North Grange, Horsforth, Leeds.
 1895. Thompson, Isaac C., F.L.S., 53, Croxteth Road, Liverpool.
 1886. Tomlin, J. R. Brockton, B.A., Stancliffe Hall, Matlock, Derbyshire.
 1897. Tripe, Linnæus, Major-Gen., 3, Osborne Villas, Stoke, Devonport, Devon.
 1897. Tulk-Hart, Eugene John, M.D., 4, Gloucester Place, Brighton.
 1898. Turner, E. Hartley, A.C.A., 21, Bairstow Street, Preston, Lancs.
 1899. Vaughan, J. Williams, J.P., The Skreen, Erwood, R.S.O., Radnorshire, S. Wales; winter address: Bryn-y-Mon, Tenby, S. Wales.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea, S. Wales.
 1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan, U.S.A.
 1886. Watson, Rev. R. Boog, LL.D., F.L.S., etc., 11, Strathearn Pl., Edinburgh.
 1900. Watson, Hugh, The Ridgeway, Haslemere, Surrey.
 1900. Webb, Walter, F., 416, Grand Avenue, Rochester, N.Y., U.S.A.
 1895. Webb, Wilfred Mark, F.Z.S., 7, Campbell Road, Hanwell, London, W.
 1902. Weeks, Wm. H., jr., 508, Willoughby Avenue, Brooklyn, U.S.A.
 1895. Welch, Robert John, 49, Lonsdale Street, Belfast.
 1897. West, H. J., 80, Upland Road, East Dulwich, London, S.E.
 1886. Whitwell, Wm., F.L.S., 4, Thurleigh Road, Balham, London, S.W.
 1901. Wilde, J. W., 17, Hendon Road, Sparkbrook, Birmingham.
 1889. Williams, John M., 20, Huckins Hey, Liverpool.
 1891. Williamson, Rev. Charles Arthur, M.A., 14, Upper Mount Street, Dublin.
 1899. Wilson, Arthur Ernest, 228, Victoria Street, Grimsby.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1901. L Woodruffe-Peacock, Rev. E. A., F.L.S., etc., Cadney, Brigg, Lincs.
 1898. Woods, Henry, M.A., F.G.S., St. John's College, Cambridge.
 1886. L Woodward, Bernard B., F.L.S., etc., 120, The Grove, Ealing, London, W.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.

LONDON BRANCH—Annual Report.

DURING the past year eight ordinary meetings of this Branch have been held, besides five field meetings in the summer.

The exhibits at the ordinary meetings have been varied and interesting, but the attendance of members continues to be small. Our thanks are due to Mr. J. C. Dacie and to the Rev. J. W. Horsley for their kindness in entertaining some of our members in March and June respectively.

9th Nov., 1901.

J. E. COOPER,

Hon. Sec.

THE CONCHOLOGY OF THE CLYDE: GEOGRAPHICAL AND BIOGRAPHICAL.

(Presidential Address delivered at the Annual Meeting, Sept. 13, 1901).

BY ALEXANDER SOMERVILLE, B.Sc., F.L.S.

My first duty, on taking the place I do to-night, is to offer personally to the Society my very hearty thanks for what they did a year ago in placing me in the President's chair, conferring on me thereby the highest honour which it is in their power to bestow. Standing before you to-night I truly wish that the distinction were better deserved, for I can claim to have added but little to the literature of conchological science. What shall I say in regard to what your kindness has led you to do in continuing my presidentship for a second year? This only, that I thank you most sincerely for the unmerited honour.

Apart from attention given to the subject in early youth, it was during the thirteen years, from 1878 to 1890, that with some enthusiasm though with serious interruptions, I pursued the study of the British marine mollusca.

In 1881, after a prolonged residence in India, I had the interesting privilege of making the acquaintance, on the Riviera, of that veteran of conchological science, Mr. Sylvanus Hanley, President shortly before his death, of this Society, joint author, as all here know, with Professor Edward Forbes, of the now classic work, "A History of British Mollusca." At Mr. Hanley's proposal, and with his name at the head of my nomination paper, I became a Fellow of the Linnean Society in 1881. We can all realize what a spur such a circumstance was likely to prove, and it certainly inspired me to follow on in the study to which Mr. Hanley devoted his long life. During the earlier succeeding years I had considerable opportunity for dredging on the West of Scotland, from Lamlash Bay northward to Loch Broom and Stornoway, in the lochs of the mainland and in those more open waterways, the Sound of Jura, Loch Linnhe, the Sound of Sleat and the Minch.

At the beginning of 1886, aided by the valued counsel of Mr. J. T. Marshall, of Torquay, and of Professor J. R. Henderson, M.B., now of Madras, and, as regards the Cephalopoda, of our esteemed Hon. Secretary, Mr. W. E. Hoyle, I brought out a List of British Marine Shells, according to the arrangement in Jeffreys' "British Conchology," which, I believe, has been somewhat generally used. In consultation with the gentlemen named, the evidence for admitting each separate species into the British fauna was carefully weighed, three of Jeffreys' species being rejected in the process, owing to the absence of record of the occurrence of living specimens within what Jeffreys considered

strictly British waters. No new species were added, though there had been an interval of sixteen years from the completion of Jeffreys' work. The list was brought before the Society at its meeting on 4th February, 1886, and was referred to in kind terms from the chair by Mr. W. Denison Roebuck, the President.

This list is now superseded by the valuable revised list which has been laid on the table to-night, on which a special committee of the Society has spent so much successful labour, and which includes the species occurring in so much wider an area. I have heartily to congratulate the Society on having produced, and on now being the possessor of this truly valuable list.

The Clyde estuary has long been known as rich ground for the student of the marine mollusca. As the land neighbourhood of the estuary is remarkable for variety of situation suited to the study of entomology, ornithology, and of plant life, so we have in the estuary itself, remarkable variety of sea-bottom, with a relatively extensive coast-line girding its sea-lochs and islands. Lining the sea-board of Ayrshire, which county forms, except for a small upper portion, the eastern flank of the estuary, we have, during a considerable part of its extent, flats of remarkably clean sand between tide-marks and far beyond, while in lower Loch Fyne, throughout the Kintyre eastern coast and in Arran—all of them on the western side of the open firth—we meet with a more or less rocky coast-line with littoral and sublittoral species peculiar thereto. Intermediate between these eastern and western boundaries and forming the bottom not only of the lower reaches of the estuary, but running up all its lochs and channels, we find, naturally enough perhaps, a bottom of soft dark mud, impalpable in many places, with here and there an admixture of sand and sandy gravel, and more rarely of broken shells.

The Clyde estuary, physically, is not remarkable for its extensive, varied, and flexuous coast-line alone. Within comparatively easy reach we have at many places water of great depth, furnishing dredging conditions such as might be supposed only to be had many leagues from land, and yet in almost direct communication with the Atlantic. Off the eastern coast of Arran there are areas where the depth averages sixty fathoms, while to the north of Arran, and in the lower reaches of Loch Fyne water of eighty fathoms and above is met with. Some present are aware that off Skate Id., Lower Loch Fyne, there is a deep hollow where the sounding-line indicates a depth of 107 fathoms. This area is both near and accessible to what is now the centre of marine biological work on the Clyde, viz., the Island of Great Cumbrae. These remarks on our estuary I offer with reserve when I think of the admirable work done by other observers connected with the Scottish Marine Station.

Perhaps no one is better acquainted with the deeper waters of the estuary than Sir John Murray, whose explorations conducted in the "Medusa," sixteen years ago and later were of an exhaustive character. Under Sir John Murray's direction Professor Henderson, assisted by Mr. F. G. Pearcey, and, on the physical side, Dr. Hugh R. Mill, did excellent work.

In the time that remains to me this evening, I should like to make brief references to some of the gentlemen with whom I have been privileged to come into direct contact, who have worked in the Clyde estuary among the mollusca and other groups, in the hope that such details may be of interest to the Society.

The first name I shall mention is that of the Rev. Dr. David Landsborough, A.L.S., of Saltcoats, Ayrshire, specially known for his acquaintance with marine Algæ, who published in 1849 the first edition of what long remained the standard *popular* work on British seaweeds, a work which I hardly think has been superseded by any other. For many seasons Landsborough visited Lamlash Bay, Arran, with Dr. R. K. Greville of Edinburgh, and Major Martin. In his "Excursions to Arran," published first in 1847, he furnished two lists of mollusca found by himself in Lamlash Bay, one being of shells obtained when dredging in 1844 with Mr. James Smith, of Jordanhill, the other of the results of his dredging with Mr. Joshua Alder and Major Martin in 1846. I had the privilege in 1850, when a young boy, of being present on one occasion with Dr. Landsborough when dredging in Lamlash Bay, and I can remember being handed a specimen of that interesting starfish, *Luidia fragilissima*, which, according to its custom, was breaking up into fragments. I possess to this day a specimen of *Psammobia vespertina* and other shells given me as an incentive to study by Dr. Landsborough.

The next I have to name is the Rev. Dr. C. Popham Miles, F.L.S., a Church of England clergyman in Glasgow, who in 1856 prepared jointly with Dr. Greville already referred to, a "Report of Dredging in the Firth of Clyde," which appeared in the British Association Report of that year. I can remember in Dr. Miles' house in Glasgow a rectangular oblong aquarium, three feet in length, of plate glass, in which was a large stone grown over with young *Fucus*, and a specimen of the crab *Portunus puber*, which had lived contentedly in solitude for many months. Dr. Miles left Glasgow to become principal of a college in Malta. During the later years of his life, at least, he was a Fellow of the Linnean Society, and lived in London.

I have now to name one happily spared to marine biological science, and lately a President of this Society. I refer to the Rev. Canon A. M. Norman, F.R.S., who so far back as in the *Zoologist* for 1857-60, issued papers entitled "The Mollusca of the Firth of

Clyde." He had for some years been tutor in the family of a late Lord Glasgow, at Millport, Cumbrae, and his investigations were chiefly conducted in that neighbourhood. He has, as I need hardly say to those present, extensive knowledge of many marine groups. It was my privilege to have a day's dredging with Dr. Norman and others in the "Medusa," in the deeper waters of Loch Fyne in 1885.

The next I have to speak of was that remarkable man, the late Dr. David Robertson, known as the "Cumbrae Naturalist," the story of whose life was, from his own lips, written down by Rev. T. R. R. Stebbing, F.R.S. With Sir John Murray, Dr. Robertson was the joint originator of the Millport Marine Station. On many occasions I have enjoyed his hospitality, and been with him in dredging expeditions. His life-long collections, given to the Biological Association, are to be seen at the station. Dr. Robertson is not likely soon to be forgotten.

In Mr. Alfred Brown, of Glasgow, we have one who for many years was an indefatigable dredger, chiefly around Bute and in Loch Fyne. He published in 1878, in volume form, an excellent list of the mollusca of the Clyde, giving the results of his own researches set down in interesting style.

I conclude this recital by referring to one of the most praiseworthy living workers in biological science, who has advanced to the position he occupies solely by his own exertions; I refer to Mr. Thomas Scott, F.L.S., now Naturalist to the Fishery Board for Scotland, a loveable man, and one who has had a career truly as interesting as that of Thomas Edward, the Banffshire Naturalist. Originally a mason in Greenock, he began teaching a class of botany there, at the same time exploring with Mr. James Steel, of Glasgow, the glacial clays at Garvel Park, between Greenock and Port Glasgow. He then became assistant to Mr. George Brook, F.L.S., at the Tarbert Station of the Fishery Board for Scotland, from which he was transferred to Edinburgh, and he has, as stated, now been for many years Naturalist to the Fishery Board. He is a high authority on the minute Crustacea and other groups. Mr. Scott contributes no fewer than four lists to the British Association volume on the Fauna, Flora, and Geology of the Clyde just issued.

In my address I have confined attention to the mollusca which inhabit the sea, making no reference to the field of land and freshwater species, to which the members of this Society have, from the first, devoted so much attention. In this field they have acquired a wide reputation in connection with investigations which have elucidated many abstruse points in the life-history, habits, and anatomy of the Gastropods especially. For this omission I feel that no apology is needed, as this department of Malacology has received exclusive attention in some previous addresses from this chair.

In conclusion let me express the hope that the mollusca will always continue to receive attention from leading zoologists of the day. In how many cases has attention in the first instance to the mollusca led, in course of time, to the study of marine zoology as a whole?

With the opportunities which now occur for visiting, by private vessels, far out-lying ground, and for exploring profound depths at no very great distance from our shores, we have little reason to doubt that the British marine list, large though it now is, will be yet further expanded.

May we not say that science owes a debt of gratitude to the mollusca? Is it not the case that the shells of molluscs, found in nearly all rock formations which possess organic remains, have been of no little service in aiding the geologist in determining the relative age of these formations? Apart from the value and usefulness referred to, have we not always before us the exquisiteness, alike in form, in sculpture, in colouring, and in variety of those creations which belong to the field which specially interests us? Is there not yet another reason why these creations should attract our observation and excite our interest, namely, that they come forth from Him from whose hand all that emanates is in the highest degree and at all times deserving of our attention and study?

Report on the Hope and Castleton Ramble, July 6th.—When we started from Manchester the weather was dry, and had been so for some days previously, but on arriving at Hope we were agreeably surprised to find the hill tops covered with a dense mist, and later on it commenced to rain, bringing out the thirsty snails and slugs in great profusion. Cave Dale was first thoroughly searched, and thence we went on through Castleton to the Winnatts. The rocks and nettle-covered sides of Cave Dale produced *Helix lapicida* and *H. arbustorum* in countless numbers, and we here made the chief find of the day, a nice colony of *H. hortensis*, a new species in this part of Derbyshire. We also took many species high up on the grassy slopes and mossy ledges just below the Castle. On both sides of the road leading out of Castleton village, towards the Winnatts, *Arion ater*, *H. nemoralis*, and *H. arbustorum* were plentiful, and we took some remarkably conoidal forms of the last. Between here and the Winnatts there seems to be a barren patch, where we got nothing, but on arriving at the Winnatts we found the rocky sides and slopes simply alive with various species. The following is a list of species obtained: Cave Dale—*Helix arbustorum*, var. *luteo-fasciata*, var. *flavescens*, var. *major*, *H. nemoralis*, var. *rubella*, var. *libellula*, var. *albo-labiata*, *H. hortensis*, var. *lutea*, var. *minor* (two of the latter showing oblique umbilicus); *H. lapicida*, *H. rotundata*, *H. hispida*, *Hyalinia cellaria*, *H. crystallina*, *H. pura*, *Clausilia perversa*, *Pupa cylindracea*, *Vitrina pellucida*, *Bulinus obscurus*, *Cochlicopa lubrica*, var. *lubricoides*. Road to the Winnatts—*Helix arbustorum*, var. *conoidea*, *H. nemoralis*, var. *rubella*, var. *libellula*. The Winnatts—*Helix arbustorum*, *H. nemoralis*, var. *castanea*, var. *rubella*, var. *libellula*, var. *interrupta*, var. *compressa*, var. *albo-labiata*, (four specimens have a deep umbilicus); *H. lapicida*, *H. rotundata*, *H. rupestris*, *Hyalinia cellaria*, *H. nitidula*, *Clausilia perversa*, var. *tumidula*, *Pupa cylindracea*, *P. muscorum*.—J. W. JACKSON. (Read before the Society, October 9th, 1901).

THOMAS ROGERS.

By J. COSMO MELVILL, M.A

(Read before the Society, Oct. 9th, 1901.)

FEW men will be missed more in local scientific circles in Manchester and the neighbourhood than Thomas Rogers, whose sudden death on 30th May last, has deprived us of one whose kindly presence and unceasing energy had long endeared him to all with whom he had come into contact. How often he has presided at the meetings of the Conchological Society, up to the very last gathering in May last, held just a fortnight before his death, the archives of the society will show. For some years he had acted as Recorder, and at the last annual meeting was unanimously elected a Vice-President of the society.

Born at St. Helens, Lancashire, in 1827, he very early in life migrated to Manchester, and among the earliest offices he held was one in the firm of Labrey & Sons, Tea Merchants. The late Mr. B. Bowman Labrey was a devotee of natural history, more particularly, turning his attention to entomology; indeed in after years his collection of exotic lepidoptera became one of the finest in the North of England. He may be said to have been the first to implant in young Rogers' mind that love of biological science which became so important a factor in his career. Subsequently he set up in business on his own account, first in Cookson Street, and finally in Oldham Road, Ancoats, quite in the heart of the busiest and smokiest district of Manchester.

It was in 1857 that a short article published by him in the "National Magazine," relative to the growing of ferns and other plants in simple Wardian cases, attached to window casements of houses in crowded cities, attracted considerable notice, and brought him into some prominence, and gained for him numerous friends and correspondents. Indeed, Mr. Rogers may be said to have been the last connecting link between the celebrated old coteries of botanists and naturalists of Lancashire, with most of whom he had been acquainted, and the present race of biologists. Amongst his special friends, to name a few out of many, were the late Mr. J. Nowell, of Todmorden, Dr. John Bland Wood, of Broughton, Manchester, Mr. Abraham Stansfield, Mr. John Whitehead, of Oldham, Mr. S. Ashton, Mr. John Hardy, Mr. J. Percival, and Mr. Horsefield.

Many interesting excursions to the Highlands of Scotland, the Irish Lakes, and the Welsh Mountains, accounts of many of which were published by him, were made in company with some of the foregoing or other friends.

Later in life he took up keenly the study of the mollusca, especially non-marine, and about 1870 was fortunate in discovering *Hyalinia glabra* Studer, in Marple Wood, and also *Planorbis dilatatus* Gould, a North American species, possibly adventitious in the Pendleton Canal, but neither of these species had before been recorded for Great Britain or Ireland. These discoveries were the means of opening a correspondence with Dr. Gwyn Jeffreys, F.R.S., and other leading malacologists.

Still later on he began to exchange largely, especially in shells, mosses, and ferns, with numerous botanical and geological friends in the Hawaiian Islands, Tasmania, Australia, New Zealand, and other countries, and consequently acquired in time very extensive and well-named series, mostly in very good condition. It is with his conchological studies we have more particularly to do, so I would briefly point out that his series of British land and freshwater mollusca is almost complete, and abounding in good varieties, while his exotic collection excels in special groups, *e.g.*, Japanese *Helices* and *Clausilicæ*, Hawaiian *Achatinellæ*, Tasmanian species, etc. In marine shells, his *Cypræa* will be especially remembered, so many specimens of this genus have been exhibited by him from time to time at the meetings of the Society. Two species of shells, the terrestrial *Ennea rogersi*, M. and P., a well-marked form from Natal, and the marine *Clathurella rogersi*, M. and St., from Lifu have been named in his honour.

Personally, I have the pleasantest recollections of many an evening, during the past thirty years, that Rogers spent at my house, whither he would often repair either to try and name the various fresh shells he had obtained, or, at times, ferns and other plants. He was exceedingly accurate and punctilious as to determinations, never satisfied at once, or with a mere cursory examination. He always required proof as to a locality.

He was also a charming companion on an excursion, always full of information and intellectual energy. Mr. E. Collier writes, particularly, of one visit to Cardiff in 1878, the especial quest being *Helix villosa*, reported from the neighbourhood as naturalized, and I remember a very pleasant afternoon with him in 1870, shortly after I came to reside in the North of England, when we visited Marple Wood, and found plenty of *Hyalinia glabra* Studer.

He was a voluminous letter writer, and some of his communications are very characteristic.

I may add that I have come into possession of the whole of his botanical collections, especially rich in Cryptogamia, British and exotic, and it is believed his shells will be disposed of privately.

* * * * *

Years passed on, but Rogers never seemed to grow older, indeed, he seemed gifted with perennial vivacity and youth, always on the alert to study and determine a new shell, moss, or fern.

Amongst other studies which he took up during the past few years was that of the Bryozoa, in which branch of science he found a fitting coadjutor in Miss E. C. Jelly. Egyptology, likewise, when he was over 70, much interested him, and he to some extent mastered the intricacies of the study of hieroglyphics.

But, perhaps, what he will be best remembered by is his connection with the "Ancoats Brotherhood," and the Art Museum, likewise at Ancoats, of the committee of which Mr. George Milner is chairman, and Mr. T. C. Horsfall, treasurer. He strove for years in the most single-hearted way to interest those with but few opportunities of enjoyment, in the love of nature, and artistic pleasures, and it was only in Whit-week this last summer, that he, their chosen leader, escorted over seventy members of the aforesaid Brotherhood to the Lake district, amongst the projected trips being the ascent of Helvellyn. Thursday, May 30th, proved fine, and in the best spirits he and they all started, but, suddenly, when at about 1,800 feet elevation, he complained of not feeling very well, and said he would sit down and rest by a large rock, until his friends should have completed their ascent and have returned his way. When they did so, it was to find their old friend was no more. It seemed truly an euthanasia, thus ending his life peacefully amongst scenes of mountain, lake, and valley he had always so much loved. His vasculum, half filled with plants, was found by his side. On June 1st, in the presence of many friends, he was laid to rest in the quiet churchyard at Patterdale.



Faunistic Notes.—(1). During a holiday on the Kentish coast I found *Petricola pholadiformis* very common amongst the shells washed up at Shellness, near Sandwich. (2). *Turricola terrestris* still flourishes in its unique British habitat near Dover, and is I think slowly extending its ground. But attempts at colonization in spots that seem exactly similar in conditions seem to have failed, whether made by Capt. McDakin, its first discoverer, or by myself. It appeared hardly so plentiful as in previous years. I hope the few who know its habitat have not told others nor helped themselves too freely. (3). A relative in the South African War kindly looked for land shells for me (not of the Lyddite species!), but all he sent home were *Helix aspersa* and *H. pisana*, both mainly immature—the latter was almost entirely of the var. *lineolata* type.—[Rev.] J. W. HORSLEY. (Read before the Society, Oct. 9, 1901).



PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

302nd (Annual) Meeting, September 13th, 1901.

Held in the Philosophical Society's Rooms, 207, Bath Street, Glasgow.

Mr. Alexander Somerville. President, in the Chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

Appointment of Scrutineers.

Messrs. H. Coates and W. H. Heathcote were appointed Scrutineers.

Appointment of Auditors.

Messrs. C. Oldham and E. C. Stump were appointed Auditors.

Candidates Proposed for Membership.

Miss E. M. Norton, Dr. Jas. C. Cox, Mr. A. R. Ensor.

Resignation.

Miss Jessie Reeve.

Annual Report and Balance Sheet.

The Annual Report of the Council (see p. 146) and the Treasurer's Report including an Interim Balance Sheet and Financial Statement for the current year up-to-date (see p. 147) were presented and adopted.

Reports of Committees.

The Report of the Committee appointed to draw up a List of British Marine Mollusca was presented and read and it was resolved :—

That the List of British Marine Mollusca drawn up by the Committee be accepted and published by the authority of the Society, and that its members be recommended to adopt it in their conchological work.

The Committee for Collective Investigation stated that they had not yet received sufficient information on which to base a formal report. They were reappointed for another year.

Death of Mr. Thomas Rogers.

It was resolved : That the Conchological Society desires to express its regret at hearing of the decease of Mr. Thomas Rogers, one of its Vice-Presidents, and to place on record its sense of the services rendered by him to the science of conchology at large, and to the Society in particular, as well as to offer its heartfelt sympathy to Mrs. Rogers and her family in their bereavement.

The Fred. P. Pullar Memorial Prizes.

The Secretary reported that he had received a letter from the Secretary of the Marine Biological Association of the West of Scotland, announcing the offer by Sir John Murray, K.C.B., of three prizes in memory of the late Fred. P. Pullar.

The prizes are of the value of £50 each, and the subjects of investigation proposed are :

1. The Seasonal Distribution and Development of Pelagic Algæ in the Waters of the Clyde Sea Area.
2. The Reproduction, Development, and Distribution in the Clyde Sea Area of the Genera *Nyctiphanes* and *Boreophausia*.
3. The Formation and Distribution of Glauconite in the Deposits of the Clyde Sea Area and the adjacent seas of Scotland.

Further particulars may be had from Mr. John A. Todd, 190, West George Street, Glasgow.

Election of Office-Bearers.

The Scrutineers reported that thirty-eight valid papers had been received, and that thirty-five had voted for the list as proposed by the Council. The Officers and Council in the list given on p. 130 were therefore declared to be duly elected.

The Presidential Address

was then delivered by Mr. Alexander Somerville, B.Sc., F.L.S., who took for his subject "The Conchology of the Clyde: Geographical and Biographical" (see p. 137).

Exhibits.

By the President: A collection of British Marine Mollusca, specially rich in species and varieties from the estuary of the Clyde and adjacent seas.

By Mrs. Carphin: Specimens of *Stilifer stylifer* from the mouth of the Firth of Forth, believed to be the only ones recorded from that locality, and a sinistral specimen of *Helix hispida* also believed to be the first recorded.

ANNUAL REPORT, 1900-1901.

The Annual Meeting being held this year in September, instead of in October as usual, the Report covers a period of only eleven months, during which eight meetings have been held, which have been well attended.

It is pleasant to record that the increase in the Society's membership which took place during the previous year, has been repeated with interest during the past eleven months; no less than twenty-three members joined the Society from October, 1900, to September, 1901. Against this must be set a loss of five members by resignation, and four by death, whilst in addition, the Council has had the painful duty of striking off the roll no less than four members for the non-payment of their subscriptions, in terms of Rule 4, as amended at the last Annual Meeting. The Council hope it may not be necessary to repeat this process, though several members seem to be qualifying for a similar fate.

The members whose death the Society has to deplore since the date of last Report are:—Dr. C. C. Claremont, of Hampstead; Mr. W. A. Cockshott, of Liverpool, an energetic worker, whose death within six months of his election cut short what promised to be a career of much usefulness to the Society; Mr. G. Sheriff Tye, of Birmingham, who had been a member for upwards of twenty years, and contributed more than one article of interest to the Journal; and Mr. Thomas Rogers, of Manchester, one of our Vice-Presidents, and a most constant attendant at the Society's meetings. A memoir of his life and work, from the pen of Mr. J. Cosmo Melvill, is in preparation and will shortly be read before the Society.

The Committee appointed to draw up a revised List of British Marine Mollusca has been actively occupied during the past year, and has now presented to the Council its final report. This report has been accepted by the Council, which now suggests to the Society the desirability of publishing the List as now amended as an official document, and urging upon members the adoption of it in their conchological work.

The Committee for Collective Investigation has published two sets of queries, each containing five questions, in which they have asked information from conchologists. They have not as yet received a sufficient number of replies to enable them to draw up a report, and have been reappointed by the Council to enable them to continue their enquiries.

Three numbers of the Journal have appeared since the last Annual Meeting, containing 96 pages and several illustrations, and the number for October is all in type and will be ready for issue on the first of the month as usual. It is not without a feeling of satisfaction that the Council reminds the members that since the preliminary delays consequent on the taking over of the Journal were got over, every number has appeared at its proper time.

During the past year donations have been received for the publication and illustration fund from the President, and from Messrs. H. Wallis Kew and J. H.

Ponsonby. Donations to the cabinet from Messrs. John Linton, Chas. Oldham, F. Taylor, and the Rev. R.W. J. Smart. Donations to the library (in addition to the periodicals and transactions acquired in exchange for the Journal) have been received from Messrs. Chas. Creighton, G. K. Gude, H. Wallis Kew, E. D. Marquand, R. E. C. Stearns, and Albert Wood.

The List of Societies and Institutions to which the Journal is forwarded has been revised and now includes forty different addresses in all parts of the world.

The Balance Sheet for the year 1900 having been audited by Messrs. Chas. Oldham and E. C. Stump was presented to the March meeting and published in the Journal (see p. 55 *antea*). The Treasurer has prepared an interim Balance Sheet and statement on the Society's present financial position, which the Council has ordered to be laid before the Annual Meeting.

In conclusion the Council desires to remind the members that the publication of the Journal in its present form and scope absorbs almost the whole of the Society's income, leaving very little for illustrations and working expenses. They therefore desire to impress upon the members the importance of enlisting new recruits if the Society's work is to be maintained at the level it has now attained.

INTERIM BALANCE SHEET,

TO SEPT. 1st, 1901.

The Statement of Accounts for the year 1900, as issued by the Council Meeting held March 13th last, will be found printed on page 55 in the April number of the *Journal* for the present year, when, instead of the unusual deficit shown in the previous statement, the Treasurer was able to show a balance in hand of £1 19s. 4d.

The financial position of the Society at the present time is as follows:—

| Receipts. | £ s. d. | Expenditure. | £ s. d. |
|------------------------------------|-----------------|--|-----------------|
| Brought forward | ... 1 19 4 | January <i>Journal</i> ...* 22 14 0 | |
| Donations— | | April do. ... 11 13 7 | |
| W. E. Hoyle ... 1 1 0 | | July do. ... 14 8 11 | |
| J. T. Marshall ... 2 2 0 | | | 48 16 6 |
| E. G. Stubbs ... 0 2 6 | | Reprints 4 3 0 | |
| Illustration Fund— | | Stationery 0 1 6 | |
| J. H. Ponsonby ... 1 0 0 | | Part VII. Taylor's Monograph 0 5 0 | |
| E. A. Smith ... 0 5 0 | | Winstanley (Bookbinding) ... 0 3 0 | |
| | 4 10 6 | Treasurer's Expenses to date... 0 17 0 | |
| Sale of Publications 1 15 8 | | | 54 6 0 |
| Subscriptions 47 11 6 | | Balance in hand ... 1 11 0 | |
| | <u>£55 17 0</u> | | <u>£55 17 0</u> |
| Subscriptions still unpaid ... | £15 15s. od. | | |
| Do. in arrear ... | £6 0s. od. | | |

*The extra cost of producing the January number of the *Journal* is due to the printing of the new list of British Marine Mollusca.

303rd Meeting, October 9th, 1901.

Held at the Manchester Museum, Owens College.

Mr. J. Cosmo Melvill in the Chair.

Donations to Library announced and thanks voted:

"*Dreissensia polymorpha* with attached pearl," by W. Wells Bladen;
 "Land and Freshwater Shells," by J. W. Williams; "Helicoid Landshells from

Japan," "Descriptions of new species of *Chloritis* from Loo Choo Islands"; and "Notes on species of *Plectopylis* and description of *P. plectostoma*," by G. K. Gude; "Beitrag zur Kenntniss der Gattung *Harpa*," by R. Bergh; "On the pairing of *Limax maximus*," by H. Wallis Kew; "On a slug of the genus *Veronicella* from Tahiti," by T. D. A. Cockerell; "Synopsis of the Lucinacea and of the American species," by W. H. Dall; "Handbook of the Marine Station, Millport," by John A. Todd (*from the respective authors*) and the usual periodicals received in exchange.

New Members Elected.

Miss Edith Marion Norton, Rosslyn, Westbury-on-Trym.
Dr. James C. Cox, F.L.S., Sydney, New South Wales.
Mr. Arthur Rainford Ensor, 60, Lumley Road, Skegness.

Resignations.

Mr. F. Collier; Mr. J. Moorcock.

Papers Read.

"Obituary notice of the late Thomas Rogers," by J. Cosmo Melvill.

Reports on the Rambles and on the Excursion to Millport, by Messrs. J. W. Jackson, R. Standen and W. E. Hoyle.

"*Petricola pholadiformis* at Sandwich," "*Turricola terrestris* in Britain," and "British Shells in South Africa," by the Rev. J. W. Horsley.

Exhibits.

By Mr. J. W. Jackson: A selection from the shells obtained during the three summer rambles, and enumerated in the several reports thereon; also an interesting set of *Limnaea peregra*, *L. glaber*, *Physa hypnorum*, *P. fontinale* and *Planorbis spirorbis* taken a few days before in a ditch near Dog Kennel Lane, Moss Side, a well known Manchester locality which will soon become historic, as it is being rapidly built over. The specimens shown, which are most likely the last procurable, are very much dwarfed, and scarcely a quarter the size they formerly attained, doubtless owing to the fouling of the water, or its scarcity during the past dry summer.

By Mr. F. F. Laidlaw: A species of *Alycaeus* from Borneo.

By Mr. W. H. Johnson: *Helix pisana* found alive in a bunch of bananas from Manchester market.

By Rev. J. W. Horsley: A small thin form of *Helix aspersa* and *H. pisana* var. *lineolata* from South Africa.

By Mr. R. Standen: *Fusus pericochlion* Schrnk., and *Buccinum leucostomum* Lischke, from Japan. These very rare and handsome species have recently been added to the Manchester Museum collection.

304th Meeting, November 13th, 1901.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted:
The usual periodicals received in exchange.

Candidates Proposed for Membership.

Mr. Percy F. Kensett; Mr. William H. Weekes, Jr.

Resignation.

Mrs. Heitland.

Paper Read.

Annual Report of the London Branch.

Exhibits.

By Mr. F. Taylor: *Helix hortensis* var. *roseozonata*, Dartford, Kent; sinistral *Faludina vivipara*, from the Bardsley Canal; *Helix aspersa* var. *rufulo-zonata*, Tenby; and *Physa heterostrophia*, from Woodgreen, near Birmingham.

By Mr. J. W. Jackson : *Planorbis corneus*, and a small, much eroded form of *Limnea stagnalis*, from a pond at Moss Side, near Manchester.

By Mr. R. Standen : Fine examples of *Helix novatula*, Madagascar ; *H. mackenzi*, Loo Choo Islands ; *H. pomatia*, three years' old, reared from the egg ; *Acanthinula harpa*, Maine, U.S.A. ; and *Latirus prismaticus*, Kingsmill Islands.

A number of land shells, collected by Mr. L. E. Adams, at Girgenti, Sicily, were exhibited, and duplicates distributed amongst the members present.

It was resolved to have a

Special Exhibit of the genus *Papuina*

at the December meeting.

305th Meeting, December 11, 1901.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

New Members Elected.

Percy F. Kensett, Holmesdale, Harewood Road, London, S.W.

William H. Weeks, jr., 508, Willoughby Avenue, Brooklyn, U.S.A.

It was reported that the Rev. G. A. Frank Knight, M.A., had been requested to represent the Society at the celebration of the Jubilee of the

Natural History Society of Glasgow,

and that a letter had been received thanking the Conchological Society for their courtesy in sending a Delegate.

Paper Read.

"List of the Land and Freshwater Mollusca of Surrey," by Chas. Pannell, jr.

Exhibits.

By Mr. J. W. Baldwin : A series of *Limnea stagnalis* from the Bolton Canal, and from ponds at Little Lever, shewing the extremely fragile character of the shells in that district, and the seasonal differences observed during a course of years in shells from the same ponds.

By Mr. Ed. Collier : *Vitrinizonites latissimus*, Roan Mountain, N. Carolina, U.S.A.

A fine series of species of *Papuina* was exhibited by Messrs. J. C. Melvill and Ed. Collier ; the Museum set was also shewn. The chief characters of this attractive group were pointed out by Mr. Melvill, and photographs of the radula of *P. taylorianus* shewn by Mr. Wm. Moss.

It was resolved to have the following

Special Exhibits :

| | | | | | | |
|----------|----|---|---|---|---|-----------------------------|
| January | 8 | - | - | - | - | Barbados Shells. |
| February | 12 | - | - | - | - | Cuban Helices. |
| March | 12 | - | - | - | - | Genus <i>Odontostomus</i> . |

Members are requested to send specimens for exhibition and comparison.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Nautilus, vol. 15, nos. 2-7, June-Nov., 1901.

"Collecting in Haiti," by J. B. HENDERSON, Jr. "*Alasmidonta marginata* Say," by C. T. SIMPSON. "New varieties of fresh-water shells" [*Limnea reflexa jolietensis*, Ill., Mich.], by F. C. BAKER. "New land shells from the Loo Choo Islands and Japan" [*Trishoplita collinsoni* v. *casta*, *T. hingensis*, *Kaliella austeniana*, *K. yaeyamensis*, *K. ruida*, *Georissa luchuana*, *Diplommatina insularum*, *D. cassa*, *Cyclotus hirasei*, *Tornatellina inexpectata*, *Carychium cymatoplax*], by H. A. PILSBRY.

"The American *Physa*," by O. A. CRANDALL [general notes and list of species]. "The synonymy of *Bithynella [obtusa]* Lea," by BRYANT WALKER [*Cincinnati emarginata* (Küst) preferred]. "A new Jamaican Land Shell" [*Pleurodonte adamsiana*], by G. H. CLAPP. "A new Colombian *Pleurodonte*" [*P. clappi*], by H. A. PILSBRY. "An Evolving *Ashmunella*," by T. D. A. COCKERELL.

"The Unionidae of North America," by H. VON IHERING [criticism of Simpson]. "A new Colombian *Clausilia*" [*Nenia smithiæ*], by H. A. PILSBRY. "A Gigantic Fossil *Lucina*" [*L. megameris* n.sp., 235×230 mm.], by W. H. DALL. "The American *Physa*" [*P. rhomboidea* n. sp.], by O. A. CRANDALL. "The Locality of Say's type of *Alasmidonta marginata*" [Chillicothe, Ohio] by W. J. FOX.

"A New Jamaican *Adamsiella*" [*A. jarvisi*], by J. B. HENDERSON, Jr. "The Unionide of North America," by H. VON IHERING [three sub-families: *Unionine*, *Quadruline*, and *Lampsiline* recognised; *Lampsilis sapperi* n.sp.]. "An Abnormal Chiton," by R. E. C. STEARNS [*Ischnochiton conspicuus* Cpr. with only six valves]. "The American *Physa*," by O. A. CRANDALL [*P. walkeri* n. sp.; notes on other forms]. "A New Californian *Bittium*" [*B. californicum*], by W. H. DALL and P. BARTSCH. "*Limnea auricularia* in America," by F. C. BAKER [imported from Belgium].

"Land Mollusks of the North-Eastern Group of the Loochoo Islands," by H. A. PILSBRY [Lists and Notes; *Ganesella tanegashime*, *Diplommatina tanegashime* nn.spp.]. "A New Species of *Strophitus*" [*S. wrightianus*, Flint R., Ga., figd.], by B. WALKER. "New *Pisidia*" [*P. affine*, *P. sargenti*, Michigan], by V. STERKI. "The American *Physa*" (concluded), by O. A. CRANDALL. "*Lucapina crenulata* (Sowerby)," and "*Navanax inermis* (Cooper)," [description of living specimens], by T. D. A. COCKERELL. "*Epiphragmophora kelletii* on Santa Catalina Island," by E. M. GAYLORD.

"A New Land Operculate from Haiti," by C. T. SIMPSON and J. B. HENDERSON, Jr. [*Ceratodiscus solutus* n.g., n.sp.]. "A Texan Oil Well Fossil," by T. H. ALDRICH [*Nassa beaumontensis*]. "Description of a New *Unio* [*Pleurobema missouriensis*] from Missouri," by W. A. MARSH. "A New *Unio* [*Quadrula lananensis*, figd.], from Texas," by L. S. FRIERSON. "On the Classification of the Unionidae," by C. T. SIMPSON [reply to H. von Ihering]. "How *Potamides (Cerithidea) californica* travels," by Mrs. M. WILLIAMSON. "*Cyprea citrina* Gray" [rediscovered at Fort Dauphin, S. Madagascar], by C. F. ANCEY.

La Feuille des Jeunes Naturalistes, nos. 372, 373, Oct.-Nov., 1901.

"Classification des couches tertiaires du Nord-Est du bassin de Paris (Excursion de la Société belge de géologie du 7 au 14 août 1901)," by G. F. DOLLFUS.

"*L'Anodonta anatina* de Moquin-Tandon," by C. CAZIOT [notes on synonymy].

The Journal of Malacology, vol. 7, nos. 5-8; vol. 8, nos. 1-3; Mar., 1900-Sep., 1901.

"The Land Shells of the Caroline Islands," by O. F. VON MOELLENDORFF [56 spp., 12 new forms, comparative tables of distribution]. "Note on Helicoid Land

Shells from the Canary Islands," by G. K. GUDE [correction of Mabilie]. "Note on the Asiatic Species of *Philomycus*," by T. D. A. COCKERELL.

"Description of a New Species of *Anadenus* from China" [*A. dautzenbergi*, fig. and anatomy], by W. E. COLLINGE. "On some Malformed Specimens of *Anodonta cygnea* L.," by H. H. BLOOMER [effect of shell on soft parts]. "Notes on the Genus *Sesara* Alb., with Descriptions of two New Forms" [*S. harmeri* and v. *anodonta* Assam], by G. K. GUDE. "Description of a New Variety [v. *kobeltiana*] of *Isomeria subcastanea* Pfr.," by G. K. GUDE.

"A List of a small Collection of Shells from China," by E. A. SMITH [24 spp., *Vivipara wingatei* n.sp.]. "Descriptions of two New Species of Shells: *Murex marcoensis* and *Cassis booleyi*," by G. B. SOWERBY [with figs]. "Malacological Notes," by E. R. SYKES [three-valved Chiton; *Cryptoplax* in South Africa; *Acroptychia pyramidalis*, Madagascar, *Clausilia granulosa*, Peru, nn.spp., figd.]. "On a British species of *Myrina* [*M. simpsoni* n.sp.], with a Note on the Genus *Idas*," by J. T. MARSHALL.

"Notes on some further Malformed Specimens of *Anodonta cygnea* L.," by H. H. BLOOMER. "Description of a New Species of *Veronicella* [*V. gilsoni*] from the Fiji Islands," by W. E. COLLINGE. "Note on the *Gastis douvillei* de Morgan," by W. E. COLLINGE. "*Helix lapicida* L., monst. *sinistrorsum* nov.?" by F. J. PARTRIDGE.

"Notes on the References for Authorship of Species, as given in Jeffreys' 'British Conchology,' vol. II.-V.," by the Rev. A. H. COOKE [corrects a large number of errors in Jeffreys' work]. "Descriptions of two New Species of Helicoid Land Shells," by G. K. GUDE [*Epiphragmophora dormeri*, Paraguay, *S. mouleyitensis*, Burma]. "Description of two New Species of *Microparmarion* [*M. möllendorffi*, *M. andamanica*] from the Andaman Islands," by W. E. COLLINGE [from Annam, not Andaman Islands]. "Note on *Myrina simpsoni* Marsh.," by J. T. MARSHALL [referred to Genus *Adula*]. "Malacological Notes," by E. R. SYKES [list of sp. of *Rhodea*].

"*Clausilia* mimicked by a Microlepidopteron," by H. SIMROTH. "Note sur une Linnée de la faune profonde du lac Léman," by E. ANDRE. "The Anatomy of the British Species of the Genus *Solen*, pt. I," by H. H. BLOOMER [with two pls.]. "Notes on some known Species of *Plectopylis*, and Description of a New Variety of *P. plectostoma* Bens.," by G. K. GUDE. "Note on the Anatomy of *Amphidromus palaceus* Mouss.," by W. E. COLLINGE.

"Notice sur le Professeur de Lacaze-Duthiers," by A. VAYSSIÈRE. "Malacological Notes," by E. R. SYKES [*Helicina rollei* n.sp., Kangean Island; *Rhytidopoma* n.n. for *Ctenopoma* Pfr. non Peters]. "Note upon *Trophon umbilicatus* Tenison Woods," by H. SUTER. "On the Anatomy of the *Vitrina irradians* of Pfeiffer," by W. E. COLLINGE [with two pls.]. "Note on the Anatomy of *Apera burnupi* E. A. Smith," by W. E. COLLINGE. "On the Genus *Ashmunella* Pils. & Kll.," by C. F. ANCEY, with anatomical notes by G. R. MURDOCH [catalogue of twelve forms, anatomy illustrated]. "Three New Nudibranchs [*Coryphella cooperi*, *Facellina stearnsi*, *Thecacera velox*] from California," by T. D. A. COCKERELL.

Journal de Conchyliologie, vol. 49, no. 3, 1901.

"Sur une Collection de *Plectopylis* du Tonkin, avec la description de six espèces nouvelles," by G. K. GUDE. "Description de deux Bulimulidés nouveaux provenant du Pérou," by PH. DAUTZENBERG. "Description d'un Bulimidé nouveau [*Leucocharis porphyrochila*] provenant de la Nouvelle-Calédonie," by PH. DAUTZENBERG and J. BERNIER. "Sur deux déformations observées chez des *Placostylus* de la Nouvelle-Calédonie," by PH. DAUTZENBERG. "Notes critiques et synonymiques sur quelques Mollusques (suite)," by C. F. ANCEY. "Diagnoses de quelques co-

quilles nouvelles provenant du Maroc" [*Nassa*, *Helix* two sp., *Melanopsis*], by P. PALLARY. "Nouvelle liste de Pélécypodes et des Brachiopodes fossiles du Miocène moyen du Nord-Ouest de la France," by G. DOLLFUS and PH. DAUTZENBERG.

The Naturalist, no. 539, Dec. 1901.

"*Helix aspersa* var. *exalbida* at Hubbard's Hill, Louth," by C. S. CARTER. "Note on breeding *Limnaea peregra* monst. *sinistrorsum*"; "Habits of the fry of *L. stagnalis*," by W. NELSON. "*Limax cinereo-niger* near Brigg, Linc. N.," "North-west Lindsey Land Shells: Nettleton Parish," "North-west Lindsey Mollusca: Cadney Parish," by the Rev. E. A. WOODRUFFE-PEACOCK.

Bulletin of the Buffalo Society of Natural Sciences, vol. 7, no. 1, 1900.

"Guide to the Geology and Palæontology of Niagara Falls and Vicinity," by A. W. GRABAU [with geological map].

"**Handbook of the Marine Station, Keppel Pier, Millport**," compiled by JOHN A. TODD [Description of Laboratory and Museum, as well as physical features of the District].

The Annals of Scottish Natural History, no. 40, Oct., 1901.

"Land and Freshwater Mollusca in Main Argyll," by R. GODFREY [7 spp.].

Proceedings of the United States National Museum, vol. 23, nos. 1237, 1238.

"Synopsis of the Lucinacea and of the American Species," by W. H. DALL.

"On a Slug of the Genus *Veronicella* from Tahiti," by T. D. A. COCKERELL.

Science Gossip, N.S., vol. 8, no. 91, Dec., 1901.

"*Carychium minimum*" [variations], by A. E. BOYCOTT.

Memoirs and Proceedings of the Manchester Literary and Philosophical Society, vol. 45, part 3, 1901.

"On a new species of *Sepia* [*S. koettlitzii*] and other shells, collected by Dr. R. Koettlitz in Somaliland," by W. E. HOYLE and R. STANDEN. "On the generic names *Octopus*, *Eledone*, and *Histiopsis*," by W. E. HOYLE [*Octopus* to be replaced by *Polyopus* and *Eledone* by *Moschites*, *Histiopsis* probably young of *Histioteuthis*].

The Irish Naturalist, vol. 10, no. 7, July, 1901.

"Longevity of Land Mollusca," by R. WELCH [of forty *Helix aspersa* collected in Oct., 1896, twenty were alive Oct., 1900]. "New stations for *Hydrobia jenkinsi*," by W. A. GREEN [Bann-foot, Lough Neagh].

"**Marine Mollusca and Brachiopoda**," by the Rev. G. A. FRANK KNIGHT [A concise epitome of the species recorded from the Clyde area, with nomenclature thoroughly up-to-date; this list will prove invaluable to workers in the rich fauna of the district dealt with] (*Brit. Assoc. Handbook on the Natural History of Glasgow and the West of Scotland*, 1901).

"**Helicoid Land Shells from Japan and Loo-Choo Islands**" [53 spp. annotated], by G. K. GUDE (*Proc. Malac. Soc.*, vol. 4, part 5, 1901).

"**Notes on some known species of Plectopylis, and description of a new variety of Plectopylis plectostoma** Bens." [v. *exserta*], by G. K. GUDE (*Journ. Malac.*, vol. 8, part 2, 1901).

"**Description of new species of Chloritis** [*C. oshimana*], from Loo-Choo Islands," by G. K. GUDE (*Ann. Nat. Hist.* (7), vol. 8, Aug., 1901).

"**Beitrag zur Kenntniss der Gattung Harpa**," by R. BERGH [anatomy of four spp.] (*Zool. Jahrb. Anat.*, vol. 14, part 4, 1901).

"**Dreissensia polymorpha with attached Pearl**," by W. WELLS BLADEN (*N. Staffs. Field Club*, Jan. 23, 1900).

ON THE MUCUS-THREADS OF LAND-SLUGS.

By H. WALLIS KEW.

(Continued from p. 103).

PART II.

DURING 1887-1896 I made a number of notes on various slugs, and was able to make a drawing of an *Arion* in the act of ascending its thread (fig. 5). In most of the experiments the animals were placed on twigs of needle-furze.

***Limax maximus*.**—Young individuals when placed on the twigs soon let themselves down, but fell with $\frac{1}{4}$ –9 inches of thread. I have not been able to induce full-sized or even half-grown individuals to spin.

The only specimen of ***L. cinereo-niger*** I have seen was a heavy adult which could not be induced to spin; and with ***L. flavus*** I have been unsuccessful both with adults and young. Several young, exposed to the full light of a window, and to sunshine for a time, always turned back on reaching the tips of the twigs and did not drop during the twenty minutes I had them under observation; after twenty-four days' captivity they were observed for more than an hour with similar results.

***L. arborum*.**—Numerous young fell without threads or with short ones; two reached new supports after spinning eight inches.

***Amalia sowerbyi*.**—A full-grown specimen of this somewhat large slug soon commenced a descent and did not fall until it had been suspended about five minutes, during which, however, it had made only six inches of thread; others dropped with very short threads. A number of young (either of this or the next species), about $1\frac{1}{4}$ inches long and slender when extended, descended readily, and during the operation their bodies, instead of being held for the most part in the ordinary crawling position, were much twisted, so that parts of the dorsal and ventral surfaces were presented to view together; the thread sometimes proceeded from some little distance from the tip of the tail (in some cases a quarter-of-an-inch); and the slime in these cases was seen leaving the whole width of the sole in the form of a contracting film.

***A. gagates*.**—One, about an inch long, fell with hardly more than half-an-inch of thread.

***Agriolimax agrestis*.**—A full-grown field-slug dropped with ten inches of thread, the production of which occupied about two minutes; the thread vanished into a speck of whitish slime when the slug fell. Among other full-grown individuals, one made twenty inches of thread before dropping, and another thirty inches. One was lifted by its thread and carried a little distance. A nearly full-grown specimen descended eighteen inches, then turned and ascended about an inch,

and afterwards continued its descent, making in all thirty-nine inches of thread. Numerous individuals fell with very short threads. A few were placed on twigs over water, on reaching which they usually made some sort of attempt to return upon the thread, but fell. The thread of one of these was thirty-four inches long.

A. lævis.—A full-grown specimen placed on a stick two to three feet from plants on the ground below, soon crawled off, but fell, after having been suspended ten minutes, just before reaching the plants. The thread was immediately caught up by the breeze and held almost horizontally along by the stick. Other individuals fell without threads. One, which had left its support for a space of half-an-inch, turned, ascended the short thread, and regained its former position.

Arion ater.—The young fell with three to seven inches of thread; large individuals crawled from supports, but were not supported by their slime.

A. subfuscus.—This slug, often attaining a large size, has not been seen by me to make a thread when full-grown. Young and partly-grown individuals, however, readily do so; and one made a thread 37 inches long. In the case of an individual, $1\frac{1}{2}$ inches long, I touched the tentacles with a finger wet with saliva, but the animal still continued to descend; when its thread was seven inches long, however, on my holding a strip of wood so as to cause a shadow to fall on the hinder parts of the body, the slug reversed its position and crept up the thread, finally regaining its footing upon the twig from which it had descended (fig. 5). During the ascent the head was sometimes turned a little to the right or to the left. A depression was caused by the thread upon the anterior part of the foot for about a quarter-of-an-inch, but beyond this no trace of it was observable. An accumulation of mucus soon began to appear dorsally at the tail, and gradually increased in size; it was composed, no doubt, of the slack of the thread, together with an additional film deposited during the ascent; on the little mass

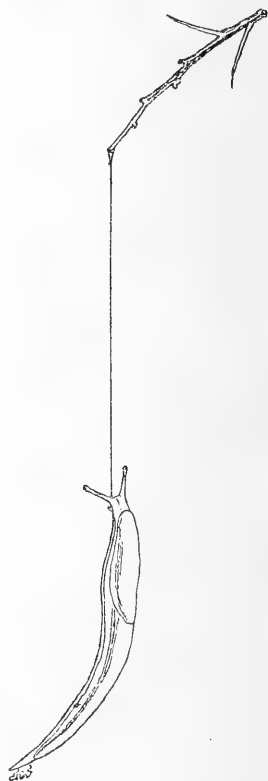


FIG. 5.

Arion subfuscus ascending the thread by which it has suspended itself from a twig; drawn from life by the writer.

being touched with a knife, a thread three to four inches long was drawn from it.

A. minimus.—Of ten specimens tried on needle-furze, one reached the table without falling, with $8\frac{1}{2}$ inches of thread; the rest (with the exception of one which remained on the twig) fell with short threads, as did others observed subsequently.

A. hortensis.—Of this slug I tried a number of nearly full-grown specimens, none of which made a long thread. The one shown in fig. 6 reached a new support after a descent of $7\frac{1}{2}$ inches.

A. circumscriptus.—In a number of trials, under various conditions, both young and adults allowed themselves to drop either without threads or with short ones. One, kept in a tin for fourteen days without food, descended $6\frac{1}{2}$ inches to the side of the vase in which the twig was held. As the slug alighted the thread became attached to the new support and it remained, after the slug had crawled away, stretched from the twig to the vase.

Geomalacus maculosus.—A few half-grown specimens (received from Ireland, through the kindness of Dr. Scharff and Mr. Roebuck) were tried on needle-furze. One reached the table with eleven to twelve inches of thread; but the others fell soon after leaving the twigs.

PART III.

Many of the slugs observed by authors are unnamed, and it is difficult to identify others for which names are given. We have, however, observations for seventeen to nineteen species, representing seven genera and three families :

LIMACIDÆ.

Limax maximus,
L. flavus,
L. arborum,
L. fulvus,
Amalia sowerbyi,

A. gagates,
Agriolimax agrestis,
Agr. lævis,
Agr. campestris,
Agr. americanus.

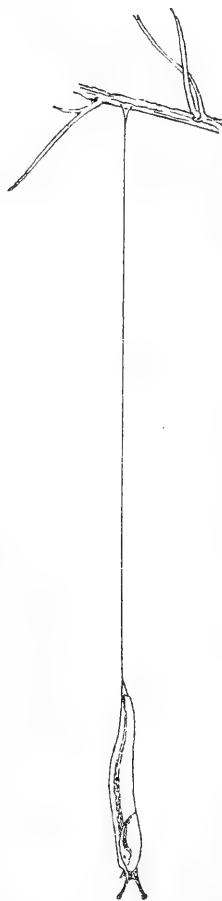


FIG. 6.
Arion hortensis descending from a twig; drawn from life by the writer.

ARIONIDÆ.

| | | |
|-----------------------|--|-------------------------------|
| <i>Arion ater</i> , | | <i>A. hortensis</i> , |
| <i>A. subfuscus</i> , | | <i>A. circumscriptus</i> , |
| <i>A. minimus</i> , | | <i>Geomalacus maculosus</i> , |
| | | <i>G. anguiformis</i> . |

PHILOMYCIDÆ.

| | | |
|----------------------------------|--|-----------------------------|
| <i>Philomycus carolinensis</i> , | | <i>Pallifera dorsalis</i> . |
|----------------------------------|--|-----------------------------|

There has been a tendency to regard thread-making as the exclusive property of a particular spinning-slug ; but *Limax filans* is a myth. The faculty, as we have seen, is not confined to any particular family ; and the three families just named, not immediately allied, are more nearly related to certain snails than to each other. It was long ago suggested that spinning is common to all slugs (4), and definite statements that this is the case have been made ; but everything depends on the nature of the slime, and this is known to differ from species to species. It is possible, however, that the faculty may be universal. Binney (20) saw it practised by every species of slug known to him in the Atlantic States of North America ; and the writer's observations extend to all the species which he has seen in these islands (except *L. cinereo-niger* and *L. flavus*), namely, to *L. maximus*, *L. arborum*, *Amalia sowerbyi*, *A. gagates*, *Agriolimax agrestis*, *A. lævis*, *Arion ater*, *A. subfuscus*, *A. minimus*, *A. hortensis*, *A. circumscriptus*, and *Geomalacus maculosus*.

It has been stated that it is chiefly when young that slugs spin ; but the faculty is related more to size and weight than to age, small species spinning as well, or nearly as well, when adult as when young. Very large slugs, which spin well when young, are generally too heavy to do so when full-grown ; they sometimes allow themselves to glide from an object as if about to spin ; but, instead of being retained by a thread, they fall. Tolerably large individuals, however, can suspend themselves ; this is the case, for instance, with adults of *Amalia sowerbyi*, bulky slugs 2-2½ inches long, furnished with unusually tough slime. Great grey slugs (*Limax maximus*) suspend themselves in pairs at breeding time, but the cord by which they hang differs from the ordinary threads of which we are now speaking. Mr. Standen assures the writer, however, that he once saw an adult of this slug suspended singly upon an ordinary thread, and that he has several times seen full-grown *L. arborum* similarly situated.

Statements of several authors imply that slugs are commonly seen hanging from various objects. The writer, however, who has been interested in these animals for a number of years, and has often collected them in woods, etc., by lantern-light at night, has never happened to find one suspended. The statements often refer to *L.*

arborum, the spinner *par excellence* of the books ; but this slug, when experimented upon, spins less readily than those of other genera, e.g., *Agriolimax*, etc. Mr. Standen informs me that he has seen *L. arborum* suspended under natural conditions—the same observation has been made by Bouchard-Chantereaux (10) and by Thomson (48). Similarly Lister (1) saw *Limax* hanging from trees ; Zykoff (41) saw young *Arion ater* descending voluntarily in a vivarium ; *Agriolimax agrestis* has been found by Bree (8), Harte (23), Eimer (30), and Crowther (50) descending from trees, and by Binney (20), presumably, from plants and fences ; unidentified, or doubtfully identified slugs, moreover, have been seen hanging from plants, rafters, or the glass in greenhouses by Saunders (19), Warner (34, 35), Woolford (49), as well as by three anonymous writers, and six other observers have seen the creatures spinning voluntarily from trees, projecting parts of buildings, etc. ; Blandford (46) saw slugs descending from sheaves on the wagon or stack at harvest-time, and D.T. (33) saw them coming down in numbers from clover in a loft over horses. Other than these, most of the observations recorded by authors, and all those of the writer, have been made by way of experiment.

It is easy to induce the creatures to make threads, for they will often do so if placed on small objects or in uncongenial places of any kind. Mr. Crawshay tells me that he has placed the animals for this purpose on the underside of pieces of glass held horizontally. In my own experiments the slugs were usually placed on twigs of needle-furze held in vases.

The behaviour of the creatures when placed on the twigs differs considerably in individuals of the same species. I have not noticed, however, that the species or genera differ in any marked degree, either in their manner of proceeding or in the perfection or imperfection of their spinning-powers, except that their actions in this respect are influenced by weight. *Agriolimax* spins a little better and more readily than other slugs ; next, I think, come *Amalia* and small specimens of *Arion* ; and last *Limax*. Some individuals remain for a considerable time on the twigs, turning back when they approach the extremities ; some, before abandoning themselves to a thread, stretch out in all directions in search of a fresh support, while others glide off immediately without hesitation. During descent some continually turn about and stretch out the anterior parts in search of a landing-place, and it sometimes happens that the animal revolves slowly ; by other individuals, however, few movements are executed, the animal maintaining its crawling position, and descending steadily as if resigned to its fate.

The gliding from an object is effected by the creature's ordinary crawling locomotion, the anterior part of the body being extended over the edge of the object, so as to become free. The animal can main-

tain a horizontal position when only the tip of the tail remains upon the object ; moreover, it can swing and curve its body in all directions, and even at this juncture can return to the object it has so nearly abandoned. If the forward motion is continued, it happens at last that the tail no longer remains in contact with the object, and if everything is favourable the animal is suspended by a gradually lengthening thread, which is left by the body at the tail. It sometimes happens that a slug, in this manner, reaches a new support without a fall. This, however, is a comparatively rare event. Sometimes the animal falls without a thread ; at other times it makes but a very short one, and often, perhaps generally, the thread fails after attaining a length of a few inches. These remarks apply not only to heavy slugs but to small ones capable sometimes of producing threads of surprising length. In the writer's experiments, the twigs were in a few instances three to four feet from a new support, but in most cases the distance was less than a foot ; yet of twenty-two *Agriolimax agrestis* only six reached a support without a fall—of the remaining sixteen, four fell without a thread or with less than two inches, and twelve with an average of nine inches. Of ninety-four slugs of various kinds (generally small) not more than thirteen accomplished the journey successfully. Thus the slug's descent is of a very uncertain kind. The animal's ability to make and continue a thread is so doubtful, indeed, that one is always prepared to see the creature fall ; and it is obvious that the spinning-faculty here obtaining is of extreme imperfection. It is interesting to note, however, that Bouchard-Chantereaux (10) saw young *Limax arborum* descending from one branch of a tree to another, and that Warner (35) saw a slug descend without a fall from a rafter in an orchid-house, a distance of seven feet. D.T. (33), moreover, appears to have seen the successful accomplishment of yet longer descents.

The individual differences observable depend partly on the disposition of the animal and partly on the nature of its surroundings with regard to light or shade, moisture or dryness, etc. Some seem determined at all risk to leave the object on which they are placed ; they crawl off quickly, in a reckless manner, and the thread if formed at all generally fails immediately. The ability to continue the thread depends largely on the nature and consistency of the slime at the time of the descent, and also, no doubt, on the regularity and continuity of the supply. Harte (23) remarks that slugs kept for a night under a glass spin better than those freshly taken, the slime being too thin when they are gorged with food ; and the writer has found that spinning-powers are apt to be increased by two to three days' confinement, with a little water, in nearly air-tight tins. *Arion circumscriptus* spun excellently after having been in a tin, without food, for a fortnight. Tye (31) on the authority of Harte's remark, has supposed that the animals

spin best when hungry and in search of food; but the faculty is facilitated, I imagine, more by the greater consistency acquired by the slime during captivity than by reduction of weight or other circumstances attending abstinence.

As regards the length of thread a slug is able to produce, it may be recalled that the thread of the small slug observed by Shaw (3) appears to have been nearly eight feet long, and even this is probably exceeded by threads of *Agriolimax agrestis*? seen by D.T. (33), the latter serving, apparently, for safe descents of nine feet. Threads three to seven feet long have been recorded by Hoy (2), Latham (4), Reeve (22), Harte (23), Eimer (30), Warner (35), Ward (36), W.R. (45), Foreman (47), and Crowther (50). The writer has seen a thread thirty-seven inches long spun by young *Arion subfuscus*, and one thirty-nine inches long by *Agriolimax agrestis*. The creatures cannot often be induced to make threads many times on the same day, for they usually become reckless and fall without threads after a few trials; a remarkable series of performances, however, is recorded by Latham (4) of *Agr. agrestis*, which, placed on a window-frame, made a thread two feet long, and on being replaced made in succession four others, each apparently of a length of nearly four feet.

The speed of the descent is a little difficult to observe: *L. maximus* watched by Reeve (22) appears to have descended, rather rapidly, eight to nine inches per minute; Mr. Standen, moreover, has remarked to me on the "rapidity with which *L. arborum* slips down by its thread"; on the other hand, the slug seen by Hoy (2) was approaching the earth very slowly at the rate of an inch in about three minutes. I have not seen a range so great as that here indicated. Montagu (4) "observing by his watch" found that *Agr. agrestis* descended at the rate of $3\frac{1}{2}$ inches per minute, and this, I think, is about the rate at which the thread is usually lengthened. An *Agr. levis* observed by me made two to three feet of thread at about three inches per minute; the quickest spinning I have seen was that of *Agr. agrestis*, which made in two minutes about ten inches of thread, and the slowest that of *Amalia sowerbyi*, which spent five minutes in spinning six inches.

It is stated by Binney (20) that the creatures sometimes pause in their descent and remain in mid-air for a time, but this does not agree with the writer's experience. Nearly all my slugs descended gradually till they fell or reached a support; it is true, however, that slight pauses were occasionally observed.

While the animals are descending the locomotory muscles of the foot are in constant motion, and during the whole process one can see little wave-like appearances gliding from the tail forwards along the whole length of the foot. This appearance is the result of muscular action identical with that of the animal's ordinary crawling

locomotion. The same "waves" are observable when a slug crawls on a piece of glass, and notwithstanding their course from behind forwards, they are sometimes supposed to be vermicular undulations by which the animal is propelled; but, far from this being the case, there is in reality no change of form externally, the creature's locomotion being effected and the "waves" produced by constant elongations of the foot in front and consequent shortenings soon afterwards to the same extent behind.¹

The identity of action in spinning and in crawling is a point to which I wish to call attention.

The manner in which the thread is produced has often been misunderstood, and confusion has prevailed as to the source of the slime of which it is formed. It is necessary to bear in mind that whenever a slug is in motion it emits, mainly from the supra-pedal gland between the mouth and the foot, a continuous supply of slime, which spreads over the foot and is left on the surface over which the animal is passing, in the form of the iridescent trail with which everyone is familiar; thus the foot is never in contact with the object on which the animal is

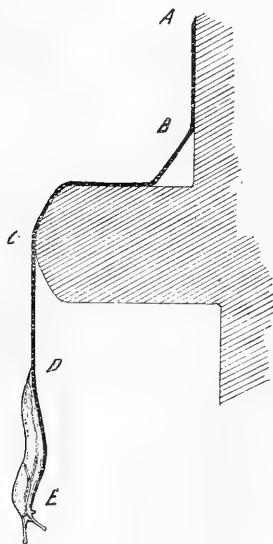


FIG. 7.
(Diagrammatic).

The slug has crawled down a window-frame and is descending from the sill. The line AE represents the continuous, very thin slime-trail and thread. The trail bridges an angle at B, and at C is continued as the thread by which the animal is retained. The slime is mainly derived at E, is crawled upon by the animal, and is left behind by it at D.

said to crawl, for the creature moves invariably upon an interposed film of slime. The writer does not know that all the slime of the trail comes from the supra-pedal gland, for there are mucus-glands in the whole skin, and those of the foot perhaps contribute to the trail; the bulk of the material, however, is derived from the gland named, and the point to be emphasized is that the suspensory thread is derived in the same manner, and represents in every respect the continuous trail of ordinary progression. When the creature crawls over a solid substance, the foot slides upon a film which is attached to the floor, and so remains as a trail; when it descends the foot slides upon an exactly similar film, which is unattached, and which when left behind collapses into a thread. Thus, in spinning, the animal crawls through the air upon a free film, just as it crawls upon an attached film over a solid object. The thread is merely a continuation of the

¹ Scharff (quoting Simroth), *Journ. of Conch.*, vol. 5, 1887, p. 239; Marey, *Animal Mechanism*, ed. 2, 1874, p. 105; Main, *Zool. Journ.*, vol. 3, 1828, p. 599.

trail found upon the object from which the animal glides, a fact illustrated in fig. 7. A slug which has crawled down the frame of a window is shown descending from the sill; the trail and thread (of extreme fineness in nature) are represented by the line AE ; the slime, mainly derived at E , is crawled upon by the animal, and is left by the tail at D , as a thread DC when the animal passes through the air, and as a trail CA when it passes over a solid body. The trail bridges an angle in the form of a short thread B . When a slug leaves an object the trail hitherto deposited upon it serves, when contact ceases, to retain the animal in the air; during the descent the tail is seen leaving the slime in the form of a film, but this immediately collapses into a thread, and soon afterwards dries and becomes silky. The thread is lengthened, primarily, by the continued crawling action of the mollusc, combined with constant emission of slime anteriorly. By means of the regularly repeated anterior elongations of the foot, the animal occupies the new slime as fast as it is emitted, and the consequent posterior shortenings of the foot, of course, leave similar quantities free at the tail. The process is accelerated by the weight of the animal, for the film of slime after being left by the tail and while collapsing is thus elongated.

We see, then, that these animals though genuine thread-makers have no special spinning-organ. The supra-pedal gland can hardly be looked upon as a spinneret, for it is situate near the head, and its secretion is not formed into a thread until passed by the hinder extremity of the body. The caudal mucus-pore of Arionids, at one time said to be a spinning-organ, has nothing to do with the production of thread.

The animals' ability to produce slime in sufficient quantity for the formation of several feet of thread has been remarked upon with surprise; but the quantity required is not greater than that necessary for ordinary creeping; and the animals are known to make nocturnal journeys of very considerable length. The inseparable connection of a continuous slime-film with locomotion, however, though a matter of common observation, is certainly remarkable; and is, perhaps, interesting for comparison with the constant discharge during locomotion of thread-forming secretions by certain arthropods, *e.g.*, some insect-larvæ and spiders.

The extreme fineness of the slug's thread is its most noteworthy character. When a slug which has been descending for some minutes falls, the thread is caught up and made to float by the slightest breath; it remains attached, of course, at the point of origin, yet difficulty is experienced in catching a specimen of it, an object moved towards it causing the filament to fly away in a most tantalizing manner. It seems incredible that such a thread serves for the suspension of a comparatively heavy slug: *Agr. agrestis*, one of the best spinners,

weighs ten to seventeen grains, and much heavier slugs can suspend themselves. It is true that the animals often fall, but as far as the writer's experience goes, the thread when once set never breaks, the fall being due either to a temporary failure in the slime-supply or to the rupture of the film while collapsing. It is possible by taking hold of the thread to lift the animal by it; this has been done by the writer; and Montagu (4) thus carried *Agriolimax* to a distant room. Saunders (19) found the thread capable of supporting a weight greater than that of the slug; he found also that it was somewhat elastic. The latter character is frequently apparent when the animal falls, the thread often springing back, curling up, and contracting considerably. According to a note communicated by Mr. Crawshay, a thread thirty inches long "contracted like elastic to nineteen inches, and dried in the air like a silk-thread." If the animal falls early in its descent, before the thread has had time to dry, a small speck of slime is all that remains; threads of longer descents, however, have considerable permanence, and may be kept in boxes or between pieces of glass for years. When a new support is reached the thread, though it usually springs up as just described, occasionally remains attached at both extremities—this I have observed in *Arion circumscriptus*; and Mr. Standen states that he found, one morning at Oban, a thread stretching from the edge of a table to the floor, marking the aerial course of *L. arborum*, which had escaped from a box during the night. While the animals are suspended there is no difficulty in taking lengths of thread on slips of glass, and Mr. M. F. Woodward has obligingly examined with the microscope specimens thus obtained of threads of *Agr. agrestis*. A somewhat fibrous appearance is presented, but this, it is supposed, is merely due to inequality resulting from the folding and giving-way in places of the film as it collapses; cell-like bodies are observable, but do not seem to form an essential part of the thread.

Besides the use of the thread for descent, the animals can also employ it, if they do not find a support or fall, as a means of ascent to their former position. This most unlooked-for fact, perhaps the most extraordinary yet recorded of the slugs, was first noticed by Saunders (19); it has been observed also by Harte (23, 26), Zykoff (41), and W.R. (45). The slug observed by Saunders turned after descending eighteen inches. Harte several times saw *Agr. agrestis* stop, after a few inches, and commence an ascent, and some by this means regained the branches from which they had suspended themselves; on one occasion this observer had four individuals suspended at the same time, and of these three returned a distance of five inches and one of two inches, and all regained the branch in safety. The observations of W.R. also relate, probably, to *Agr. agrestis*; and Professor Eimer informs me that since the publication of his paper (30) he has seen

this slug ascend its thread ; I have heard also of a similar observation from Mr. A. E. Manger. Zykoff's notes refer to young *Arion ater*; the creatures, which lived under a bell-glass, suspended themselves from the roof, and some, without touching the bottom, reascended by their threads. I have observed short ascents by *Agr. agrestis* and *Agr. lævis*, and in Part II. have described and figured the proceedings of a young *Arion subfuscus*, which reversed its position when seven inches from its support, crept up the thread, and replaced itself upon the support. One gathers from Harte that the ascent is commonly practised, but this does not agree with my experience. It is said by the same author that if a finger moistened with saliva be held beneath the animals they will ascend upon touching it. It is certain that they may occasionally be made to return by this or similar means ; Saunders' slug commenced its retreat after its tentacles had been examined with a lens, and some of those observed by W.R. ascended after being touched on the head ; the writer, however, though once or twice successful, has often tried devices of this kind unsuccessfully, as well as others, such as placing saucers of water beneath the animals, clouding them with tobacco-smoke, etc. As regards the manner in which the reversal of position and ascent are affected, Saunders says that his slug got about its retreat "by curving the head portion of the body upwards and inwards, until it touched the hinder portion of the body, a part of which it actually climbed up, and then took to the suspending-thread"; W.R., also, says that the animals "climb up their own bodies to the thread," and this is precisely what I saw in *Arion subfuscus*. By reaching upwards this animal brought the fore-part of its foot into contact with its hinder parts, and advanced, by creeping upon its own body, until it reached the thread upon which it immediately applied its foot, and ascended, slowly but without apparent difficulty, until the support was reached. The locomotion is of the kind employed upon a solid body, a new film of slime being no doubt deposited upon the thread ; the foot remains nearly flat, but is a little folded anteriorly. An accumulation of mucus (the slack of the thread together with the new film) soon appears dorsally at the tail.

Turning to the question of the utility of the spinning faculty, we find that Harte (23, 26) who held the opinion that slugs do not suspend themselves voluntarily, supposed the thread to be useful, not for descent, but for enabling individuals which by mischance slip from their supports, to recover themselves, by ascending the thread, and thus avoid falling into water, etc. It is not likely, however, that slugs often lose their footing accidentally, and even if this were the case it is improbable that the ability to ascend the thread would often enable them to avoid water or other dangers. One author (39) mentions that a descending slug suddenly dropped on reaching water ; and failure to

return upon the thread has been observed in similar circumstances by the writer. Contrary to the opinion of Harte, the animals certainly glide from objects intentionally, and the whole process is as much a voluntary action as their ordinary locomotion. But what advantages do the animals derive from the use of the thread? It must be admitted that none is very apparent. One observer (45) who saw slugs descending from vines supposed that they did so in preference to crawling down the rough stems; and it has been stated by several authors that the use of the thread is that of coming down from heights more quickly and easily than by ordinary creeping. Their course in such cases has the advantage of being direct, but this mode of traveling does not seem to be particularly easy, and from its imperfection the creatures often fall. It is suggested by Tye (31) that spinning is chiefly called for when the creatures are seeking food, and it is true that they have thus been known to reach favourite food otherwise inaccessible, *e.g.*, protected blooms of orchids, etc., to which slugs sometimes descend in greenhouses; but it is doubtful whether the advantage thus derived is worthy of consideration. Many slugs live almost exclusively on the ground, and are well nigh omnivorous; those which live on trees subsist on fungi and microscopic vegetation found on bark and decaying wood, and in common with others which live on precipitous rocks, they graze like limpets as they creep along; they have usually an unlimited pasturage, and thus are not in the position of those animals which eat up all before them, and have from time to time to seek new feeding-grounds. Binney (20) suggests that the faculty may be a means of sudden escape from enemies, particularly of birds; but the descent is comparatively slow, and a slug hanging by a short thread could easily be secured by a bird; from smaller enemies, the creatures may possibly escape by hanging suspended, as spiders do during raids by ants; but the writer would not attach much importance to this consideration. It is chiefly when they find themselves in exposed situations that slugs have urgent need to alter their positions, and it is at such times, the writer thinks, that they chiefly allow themselves to glide from their supports. During nocturnal excursions the creatures must often arrive at positions which become unbearable with the changed conditions of day, the breaking-out of the sun, disappearance of moisture from the atmosphere, etc.; for it will be remembered that these molluscs, containing much water, requiring a constant flow of slime for progression, and having no external shell for protection from evaporation, find prolonged exposure not only harmful but often fatal. Naturally, in these circumstances, the creatures have an instinctive horror of exposure, and they constantly seek out not only shady but covered retreats. Some of the slugs seen descending in greenhouses were probably escaping from

exposed situations, near the glass, to which they had crawled during the night. That observed by Eimer (30) was descending in the early morning sun from a tree, and it occurred to the observer that the creature, surprised by the sun, had adopted this means of withdrawing from the unpleasant influence. Slugs placed on grass-stems exposed to the sun, Eimer further says, if they could not otherwise escape into shade, invariably descended. Ward's slug (36) commenced to spin "on being turned to the light"; and horror of exposure is shown, moreover, by the creatures' behaviour, as above noted, when placed on twigs; their desire to escape is generally evident under all conditions of light and shade, but their anxiety is increased, as I have noticed, when they are exposed to the sun or even to the full light of a window. Escape by this means from uncongenial dryness is illustrated by D.T. (33) who saw slugs descending by long threads from clover in a loft; and still more interesting are the observations of Blandford (46) by whom slugs were seen descending from corn-stacks at harvest-time. When the stubble is grassy many slugs collect in the butt-end of the sheaves; this end is placed outwards on the wagon or stack, and soon gets dry, whereupon, Blandford tells us, the slugs find the surroundings uncongenial, and at once descend. Escape by the same means from unpleasant environment of other kinds has also been observed: a gardener (49) placing pieces of tobacco about a slug, saw it go to and fro a few times, and then let itself down; and, further, we have the cases recorded by Eimer (30) in which slugs, dusted with lime, quickly crept from leaves, and lowered themselves to the earth.

All things considered, however, I cannot think that the animals profit much by their spinning powers. There is no reason to suppose that they would often come to grief if they dropped without a thread; which indeed they often do, sometimes by reason of the imperfection of their thread-making, and sometimes without giving themselves a chance of exercising it. Mr. S. C. Cockerell¹ noted that *L. arborum* on beeches, at Veules, clung very loosely and fell to the ground when touched. *Ariolimax columbianus*, as we have seen, frequently falls from trees; and from trials made by the writer a fall of a few feet does not appear to injure the animals. It seems doubtful, finally, whether the slugs' spinning faculty, such as it is, can be explained on the ground of its utility, and I am inclined to regard the imperfect kind of thread-making here obtaining as little more than an accidental circumstance arising out of the possession, for ordinary locomotion, of a continuous supply of tenacious mucus.

1 "L.F.W. Shells in Normandy," *J. Conch.*, vol. 3, 1886, p. 14.

TAPES GEOGRAPHICUS AND T. PULLASTRA.

BY J. T. MARSHALL.

(Read before the Society, March 19, 1902).

I WOULD not return to this subject had not Mr. B. B. Woodward gone out of his way to impugn my accuracy, inferences, references, lucidity, &c. (*antea* p. 51). These are random imputations, and have no basis.

If Gwyn Jeffreys did not look up the authorities to whom he referred, the logical inference is that he looked up the shells, or how could he form an opinion?

From Mr. Woodward's research into the authorities he gave us data, from his research into the shells not a word; hence the logical inference that he had "*apparently* ignored the shells." There is no reflection here on Mr. Woodward. He asserts that Bucquoy, Dautzenberg, and Dollfus unite these two shells, "though they give no reason for it," just as I assert that he gave none for separating them; and his inference that "probably they simply follow Jeffreys" is a gratuitous inference indeed.

Mr. Woodward's assumption of my opinion as an "echo of Jeffreys" is another gratuitous inference, "leaving much to be desired in the way of accuracy." It was a confirmation, the result of a conscientious examination, for my own sake, of authors and specimens, taking nothing for granted; and as Jeffreys omitted to tell us how far the two shells differed, I was able to do so.

My use of the word "superficial" was clearly explained in the two following lines. Evidently he has not seen the *pullastra* form with geographical lines at the posterior end (though I am fearful of hazarding the inference); they are scarce, but existent.

I readily admit overlooking in the "Porcupine" Report that Gwyn Jeffreys includes the two forms in his geographical distribution, though that does not alter the material fact.

My references were absolutely correct, and if proof were wanting that my inferences were equally so, it may be found in the discursive details now given us to qualify the bare *ipse dixit* "quite distinct," at the close of which we come to a sentence that is concrete and to the point—" *T. geographicus* appears so clearly marked off in its shape, coloration, and geographical distribution, as to be worthy to rank as specifically distinct from *T. pullastra*." Seriously, can shape, coloration, and distribution constitute a species? If so, then many hundreds still remain in the cold shade of oblivion, while in this particular case *T. geographicus* is

only one of not less than half-a-dozen distinct forms of shape and coloration, each "readily separable" from the other.

Similar circumstances attend *T. perforans*, which the author separated from his *T. pullastra* as a distinct species, and it was so held until Professor Forbes disputed its specific identity and reduced it to a variety, which has been fully accepted. One of its chief peculiarities is that although usually colourless, a specimen now and then occurs which has the posterior end more or less marked as in *T. pullastra*. So much for coloration; while as regards shape, the form *perforans* (as well as *plagia*) is still further removed from *pullastra* than even *geographicus*, with the more distinctive attributes of different habitat and sculpture. Compare also var. *oblonga* Jeffr., which in shape connects the two forms.

Mr. Woodward mentions two other points, though I do not gather how far he urges them as essentials—(1) "the hinge-plate is not so prominent" (he might also have added the teeth), "sloping back more into the valve." This is simply degree of development between a solid shell and a thinner one; precisely the same differences will be found between a thick and a thin *Cardium edule*, *Mactra solida*, or other bivalve; (2) "the posterior portion of the hinge has a strong purplish tinge." This will not bear the test. If a fair number of specimens be examined, it will be found that, in both forms, not only the position, but the shape, size, and even presence of these internal stains are of the most capricious character.

I remain firmly convinced that *T. pullastra* is the same species as *T. geographicus*, and that Jeffreys and others were right in combining them. In my point of view, *T. pullastra* is the parent stock of this highly plastic species, and has thrown off various varieties of shape and colour, of which that of *geographicus* happened to be described first.

A FINAL NOTE ON TAPES GEOGRAPHICUS.

BY B. B. WOODWARD.

(Read before the Society, March 19, 1902).

IN reference to Mr. Marshall's paper, which the Secretary has given me the opportunity of seeing, I can only add that the point of the whole case seems to be, are Mr. Marshall and I talking about the same thing? This can only be proved by the production of his specimens as suggested. Reading between the lines it begins to seem as if Mr. Marshall were unacquainted with the true *Tapes geographicus*—at least under that name.

**THE LAND AND FRESHWATER MOLLUSCA OF SURREY,
with the Localities where the Species and Varieties
have been found.**

BY CHARLES PANNELL, JR.

(Read before the Society, December 11, 1901).

HAVING personally felt the need of a guide to the distribution of species in my own county, I have compiled this list with a view to assisting other members of the Society and students of conchology, who may have opportunity of collecting in Surrey.

The county is divided into eleven districts and the extent or area of each district is determined by the border line of the county; its rivers, downs and other physiographical features as fully shown in the key given below. The classification of the Society's list of "The British Land and Freshwater Mollusca" (1892), has been followed with the addition of two or three varietal names.

The following abbreviations are used to indicate the authorities for the records given in the paper. To the gentlemen named in the list I beg to offer my thanks for the information they have been good enough to give me.

(**R.A.B.**) Rev. R. Ashington Bullen, F.L.S. (through the kindness of Mr. Swanton).

(**J.E.C.**) Mr. J. E. Cooper.

(**C.H.D.**) Mr. C. H. Deadman.

(**K.McK.**) Mr. Kenneth McKean F.L.S.

(**E.S.**) Mr. Edward Step, F.L.S.

(**E.W.S.**) Mr. E. W. Swanton.

(**C.P.**) Species found by myself.

(**C.**) Indicates that the species is recorded in the Society's Census, but has not been found by myself.

(**S.G.**) Science Gossip.

(**S.L.E.S.**) South London Entomological and Natural History Society.

The districts may be conveniently defined as—

- 1—The area east of the Wey, south of the Thames, west of the Mole, and north of the North Downs.
- 2—South of the Thames, east of the Mole, west of the Wandle, and north of 9.
- 3—East of the Wandle, south of the Thames, west of Kent, and north of 9.
- 4—South of Bourne brook, west of the Wey, east of Hants., and north of the towns of Guildford and Farnham.
- 5—North of 4, and south of Berks., Bucks., and Middlesex.
- 6—North of Hindhead, including Guildford and Farnham.
- 7—South of and including Dorking, east of Guildford, and north of Leith Hill.

- 8—Haslemere and Hindhead district, to Hants. and Sussex border.
 9—South of Croydon, east of the Mole, west of Kent, and north of Dorking and Reigate.
 10—South of 9, west of Kent, east of the Mole, and north of Sussex.
 11—South of and including Leith Hill, west of the Mole, east of the Wey, and north of Sussex.

LIST OF SPECIES.

Arion ater (L.). 8—Hindhead (Punch Bowl), Grayswood (E.W.S.); Shottermill, Haslemere (C.P.). 9—Croydon (S.G., 1883, p. 212).

v. **swammerdami** Kal. 8—Punch Bowl (E.W.S.).

v. **alba** (L.) 8—Punch Bowl (E.W.S.); Shottermill (C.P.).

v. **johnstoni**. 8—Punch Bowl (E.W.S.).

v. **rufa** (L.). 8—Grayswood (E.W.S.).

v. **marginata**. 8—Haslemere (E.W.S.).

v. ——— black footsole, sepia foot, fringe marked with red-black lineoles. 8—Haslemere (E.W.S.).

A. subfuscus Drap. 8—Haslemere, Shottermill, Punch Bowl, and Grayswood (E.W.S.).

v. **aurantiaca** Loc. 8—Shottermill (C.P.).

v. **brunnea** Lehm. 8—Haslemere (E.W.S.).

A. minimus Simroth. 8—Grayswood (E.W.S.).

A. hortensis Fér. 8—Haslemere (C.P.); Camels Dale (E.W.S.); 9—Croydon (S.G., 1883, p. 212); 10—Limpsfield (S.G., 1887, p. 139).

v. **subfusca** C. Pfr. (?) 9—Headley (S.G., 1886, p. 140).

A. circumscriptus Johnst. 8—Punch Bowl and Grayswood (E.W.S.).

Amalia sowerbyi Fér. (C.). This slug has not been found by myself, neither do any of my correspondents record it.

Limax maximus L. 8—Haslemere and Grayswood (E.W.S.).

vars. **ferrussaci** Moq., **krynickyi** Kal., **fasciata** Moq., and **marmorata** (T. D. A. Cockereil). 8—Haslemere (C.P.).

L. flavus L. 10—Limpsfield (S.G., 1887, p. 139).

L. marginatus Müll. 6—Bramley (K. McK.); 8—Punch Bowl (E.W.S.).

Agriolimax agrestis L. 8—Punch Bowl and Grayswood (E.W.S.); Haslemere and Shottermill (C.P.); 9—Croydon (S.G., 1883, p. 212); 10—Limpsfield (S.G., 1887, p. 139).

var. between **sylvatica** Moq. and **reticulata**. 9—Croydon (S.G., 1885, p. 225).

v. **sylvatica**. 9—Croydon (S.G., 1885, p. 225).

v. **punctata** Pic. 8—Haslemere (E.W.S.); (?) 9—Croydon (S.G., 1885, p. 225).

A. agrestis v. **albida** Pic. 8—Haslemere (C.P.).

v. **reticulata** Moq. 9—Croydon (S.G., 1885, p. 225).

Prof. T. D. A. Cockerell notes (*Science Gossip*, 1885, p. 225), a variety with a greyish brown body and mottled grey mantle occurring at Croydon (Dist. 9).

A. lævis Müll. 8—Punch Bowl (E.W.S.).

Testacella haliotidea Drap. (C.).

T. scutulum Sby. (K.McK.).

T. maugei Fér. 9—Leatherhead (E.S.).

Vitrina pellucida Müll. 1—Bookham (E.S.); 2—Barnes Common (S.G., 1885, p. 19); 8—Punch Bowl and Grayswood (E.W.S.); Haslemere (C.P.); 9—Warlingham (E.S.); 10—Limpsfield (S.G., 1887, p. 139); Reigate (R.A.B.).

v. **depressiuscula** Jeffr. 8—Haslemere (C.P.).

Hyalinia cellaria Müll. 2—Barnes (C.H.D.); Putney (E.S.); 8—Punch Bowl (E.W.S.); Shottermill and Haslemere (C.P.); 9—Epsom (E.S.); Kenley (S.G., 1885, p. 226); 10—Reigate (R.A.B.); Limpsfield (S.G., 1887, p. 139).

v. **viridulans**. 8—Grayswood (E.W.S.).

v. **compacta**. (K.McK.).

H. glabra (Studer). 1—Polesden (E.S.); 2—Barnes (C.H.D.); 7—Shere (S.G., 1885, p. 19); 9—Tatsfield and Chaldon (K.McK.); 10—Reigate (S.G., 1885, p. 19); Limpsfield.

H. nitidula (Drap.). 8—Haslemere (C.P.); 9—Spydon (E.S.); 10—Reigate (R.A.B.); Limpsfield.

v. **helmii** (Alder). (K.McK.).

H. alliaria (Miller). 1—Ockham (S.L.E.S.); Polesden and Ranmore (E.S.); 8—Punch Bowl (E.W.S.); and Haslemere (C.P.).

H. radiatula (Alder). 8—Grayswood (E.W.S.); 9—Purley (K.McK.).

H. pura (Alder). 8—Shottermill (C.P.); 9—Croydon and Leatherhead; 10—Godalming; Reigate (R.A.B.); Limpsfield.

v. **margaritacea** (Jeffr.) 7—Shere; 8—Haslemere (C.P.).

H. crystallina (Müll.). 1—Molesey (E.S.); 8—Punch Bowl (E.W.S.); Shottermill (C.P.); 9—Epsom (E.S.); 10—Reigate (R.A.B.); Limpsfield.

H. fulva (Müll.). 2—Barnes Common (E.S.); 8—Haslemere (S.G., 1885, p. 19); Punch Bowl and Grayswood (E.W.S.).

v. **viridula** (Taylor). 8—Grayswood (E.W.S.).

H. nitida (Müll.). 1—Ockham (S.L.E.S.); 2—Barnes (C.H.D.); 8—Haslemere (C.P.).

H. excavata (Bean). 2—Mortlake (E.S.); 9—Epsom (E.S.).

Helix rotundata Müll. 1—Bookham (E.S.); 2—Barnes (E.S.); 8—Punch Bowl and Grayswood (E.W.S.); Haslemere, Shottermill (C.P.); 9—Croydon (S.G., 1883, p. 212); Epsom (E.S.); 10—Limpsfield (S.G., 1887, p. 139).

v. **turtoni** Flem. 8—Haslemere (C.P.).

v. **pyramidalis** Jeffr. 8—Haslemere (C.P.).

v. **alba** Moq. 9—Addington (S.G., 1885, p. 19).

H. rupestris Drap. 8—Haslemere (C.P.).

H. pygmæa Drap. 2—Barnes Common (S.G., 1885, p. 19); among the North Downs (K.McK.).

H. aculeata Müll. 8—Punch Bowl (E.W.S.); 9—Croydon (S.G., 1883, p. 212); 10—Reigate (R.A.B.).

H. pulchella Müll. 2—Richmond (C.H.D.); Kingston-on-Thames (E.S.); 8—Camels Dale (E.W.S.).

H. lapicida L. 6—Farnham (K.McK.); 7—Boxhill (S.L.E.S., 1894, p. 40); 8—Grayswood and Chiddingfold (E.W.S.); Haslemere (C.P.); 9—Croydon (S.G., 1883, p. 212); Epsom, Ashstead (E.S.); Tatsfield (K.McK.); 10—Limpsfield (S.G., 1887, p. 139).

v. **minor** Moq. 8—Haslemere (C.P.).

v. **nigrescens** Taylor. 8—Haslemere (C.P.).

v. **albina** Menke. 8—Haslemere (C.P.).

H. obvoluta Müll. 7—The Druids' Grove, Dorking (K.McK.).

H. pomatia L. 2—Barnes Common (C.H.D.); 7—Gomshall (E.S.); 9—Epsom, Caterham (E.S.); Reigate (S.L.E.S., 1894, p. 87); 10—Limpsfield (S.G., 1887, p. 139); Betchingley, White Hill (K.McK.).

v. **albida** Moq. 7—Dorking (S.G., 1886, p. 98, J.W.W.). A sinistral form has been found by Mr. Kenneth McKean.

H. aspersa Müll. 2—Barnes Common (C.H.D.); 3—West Dulwich (C.H.D.); 6—Guildford; 8—Haslemere, Shottermill, Grayswood, Witley, Chiddingfold, Thursley (C.P.); 9—Croydon (S.G., 1883, p. 212); 10—Reigate (R.A.B.).

v. **zonata** Moq. 8—Haslemere.

v. **exalbida** Menke. 9—Walsingham (K.McK.); Croydon.

monst. **sinistrorsum** Taylor. West Dulwich (C.H.D.).

My own records of this common species are limited to districts 6 and 8, where it abounds in hedgerows, in and near kitchen gardens, and in the chinks and crannies of old stone walls. Not unfrequently it is found in company with *H. rufescens*, *H. nemoralis*, *H. hortensis*, *Cl. perversa*, *B. obscurus*, and occasionally *H. lapicida*. The few localities here given will serve rather to show that conchologists have generally passed over a shell to be met with everywhere than to guide to its distribution in the county.

H. nemoralis L. 2—Barnes Common (C.H.D.); 8—Thursley and Chiddingfold (E.W.S.); Haslemere, Grayswood, Witley, Shottermill (C.P.); 9—(E.S.); 10—Limpsfield (S.G., 1887, p. 139).

The remark upon the distribution of the previous species (*H. aspersa*) will apply with equal force to this and the next species (*H. hortensis*). They may be found anywhere in the hedgerows. Even in district 8, which is not a "happy hunting ground" for the conchologist, they are numerous. *H. nemoralis* is often to be met with and *H. hortensis* always after rain in summer. Some varieties and localities are given below, and I shall be grateful to any fellow members of the Society who will furnish me with notes of their observations upon these species, together with *H. cantiana* and *H. arbustorum*.

v. **minor** Moq. 8—Prestwick b.f. 12345 (E.W.S.); 10—Reigate (R.A.B.).

v. **rubella** Moq. 8—Prestwick, b.f. 00000-00300 (E.W.S.); Haslemere, b.f. 00000-00300 (C.P.)

v. **libellula** (Risso). 8—Grayswood, b.f. 00300 (E.W.S.); Haslemere, b.f. 00000-00300-12345-12345-12345 (minor)-(123)45 (coalita), (C.P.).

v. **albina** Moq. 8—Haslemere, b.f. (123)(45) (coalita) (C.P.)

v. **castanea** Moq. 8—Prestwick (E.W.S.).

v. **olivacea** (Risso). 8—Grayswood and Prestwick (E.W.S.).

v. **hyalozonata** (Tay.). 8—Haslemere, b.f. 12345 (C.P.).

v. **lurida** (Moq.). 8—Haslemere, b.f. 12345-(123)45 (coalita), (C.P.).

v. **albolabiata** (von Marts.). 8—Haslemere, b.f. 00000-12345-02345 (C.P.).

H. hortensis Müll. 2—Barnes Common (Mr. Deadman notes the occurrence of one, two, three, four, and five banded forms; 6—Guildford (C.P.); 8—Haslemere (C.P.); 9—Caterham, b.f. 00000-00300-12345 (C.H.D.); 10—Limpsfield (S.G., 1887, p. 139).

v. **roseolabiata** Taylor. 8—Haslemere (C.P.); 9—Croydon (S.G., 1883, p. 212).

v. **arenicola**. 8—Grayswood (E.W.S.).

v. **olivacea** Taylor. 8—Haslemere (C.P.).

v. **roseozonata** Ckl. 8—Haslemere, b.f. 12345-12045, and coalita forms 12(345)-(12345)-(12)3(45) (C.P.).

v. **lutea** Moq. 2—Barnes, b.f. 02345; Putney, b.f. (12)345 coalita; 8—Haslemere, b.f. 00000-12345-12(345) coalita, (12)(345) coalita (C.P.); 9—Croydon (S.G., 1883, p. 212); Warlingham (S.G., 1887, p. 178, b.f. 10345).

For district 8 I have specimens to which I have hesitated to give varietal names until after further examination.

H. arbustorum L. 2—Barnes (K. McK.); Putney (E.S.); 3—Waddon (K. McK.); 6—Godalming (K. McK.); 10—Limpsfield (S.G., 1887, p. 139); Redhill (R.A.B.); Godstone (K. McK.); Reigate (S.G., 1885, p. 19).

H. cantiana Mont. 2—Barnes (C.H.D.); Mortlake (E.S.); 6—Guildford, Milford (C.P.); 8—Haslemere (C.P.); Grayswood, Witley and Chiddingfold (E.W.S.); 9—Croydon, Epsom, Warlingham (E.S.); 10—Reigate (R.A.B.).

v. **rubescens** Moq. 8—Grayswood (E.W.S.); Haslemere (C.P.)

v. **pyramidata** Colb. 8—Haslemere (C.P.).

H. cartusiana Müll. 9—Banstead Downs (K. McK.).

H. rufescens Penn. 2—Richmond (Garner); Putney and Mortlake (E.S.); Barnes Common (C.H.D.); 6—Guildford (C.P.); 8—Haslemere and Chiddingfold (C.P.); Punch Bowl and Grayswood (E.S.); 9—Epsom (E.S.); Croydon (S.G., 1883, p. 212); 10—Limpsfield (S.G., 1887, p. 139); Reigate (R.A.B.).

v. **depressa** Taylor. 8—Grayswood (E.W.S.).

H. hispida L. (= *H. concinna* Jeffr.). 2—Putney and Barnes (E.S.); 8—Haslemere and Shottermill (C.P.); 9—Epsom (E.S.); Croydon (S.G., 1883, p. 212); 10—Reigate (R.A.B.); Limpsfield (S.G., 1887, p. 139).

v. **hispidosa** Mousson (= *H. hispida* Jeffr.). 8—Shottermill, Haslemere (C.P.).

v. **subrufa** Moq. 8—Shottermill, Haslemere (C.P.).

v. **albida** Jeffr. 2—Richmond (Garner).

H. granulata Alber (= *H. sericea* Jeffr.). Epsom, Headley (E.S.); 10—Limpsfield (S.G., 1887, p. 139).

v. **carinata** Taylor. 8—Haslemere (C.P.).

H. itala L. (= *H. ericetorum* Müll.). 1—Ranmore (E.S.); 6—Guildford (C.P.); 9—Woldingham, Epsom (E.S.); Croydon, Reigate (R.A.B.).

H. caperata Mont. 1—Polesden (E.S.); 2—Barnes Common (C.H.D.); 6—Guildford (C.P.); 7—Gomshall (E.W.S.); 8—Haslemere (C.P.); 10—Reigate (R.A.B.); Limpsfield (S.G., 1887, p. 139).

v. **bizonalis** Moq. 8—Haslemere (C.P.).

v. **ornata** Picard. 8—Haslemere (C.P.); 10—Mersham (K. McK.).

v. **obliterata** Picard. 8—Haslemere (C.P.).

v. **fulva** Moq. 8—Haslemere (C.P.).

v. **subscalaris** Jeffr. 8—Haslemere (C.P.).

v. **major** Jeffr. 8—Haslemere (C.P.).

H. virgata Da Costa. 1—Ranmore (E.S.); 2—Barnes Common (C.H.D.); 6—Guildford (C.P.); 8—Shottermill (E.W.S.); 9—Epsom,

Mickleham (E.S.); Croydon (Mr. Kenneth McKean has found at the Beggars' Bank, Croydon, no less than fourteen varieties of this species).

v. **alba** Taylor. 1—Fetcham (E.S.); 6—Guildford (C.P.); 7—Dorking (S.G., 1889, p. 20).

v. **tessalata** (Bouch.). 6—Guildford (C.P.).

v. **lutescens** (Moq.). 6—Guildford (C.P.).

Buliminus obscurus (Müll.). 1—Ranmore (E.S.); 8—Haslemere (usually single specimens and very rarely more than two or three. The variety predominates) (C.P.); 9—Epsom, Mickleham and Warlingham (E.S.); Croydon (S.G., 1883, p. 212); 10—Reigate.

v. **albina** Moq. 8—Haslemere, Shottermill (C.P.).

Pupa cylindracea Da Costa (= *P. umbilicata* Drap.). 7—Westcott (E.S.); 8—Houndleswater, Haslemere (E.W.S.); 9—Caterham, Warlingham (Garner); Gatton (K. McK.); 10—White Hill (K. McK.).

P. muscorum (L.) (= *P. marginata* Drap.). 2—Walton (K. McK.); 9—Epsom (K. McK.); 10—Reigate (R.A.B.).

v. **edentula** (?) Moq. 2—Walton (K. McK.); 9—Epsom (K. McK.).

Vertigo antivertigo (Drap.). 2—Barnes Common (C.H.D.); 4—Brentwood (Basingstoke Canal) (K. McK.); 8—Punch Bowl (E.W.S.).

V. pygmæa (Drap.). 2—Barnes (C.H.D.). Mr. Kenneth McKean describes this species as being very common in woods.

V. substriata (Jeffr.). 8—Punch Bowl (E.W.S.).

V. edentula (Drap.). 8—Punch Bowl, Grayswood (E.W.S.); 9—Caterham, Warlingham (Garner).

Balea perversa (L.). 1—Coombe (K. McK.); 8—Haslemere (C.P.).

Clausilia perversa (Pult.) (= *C. rugosa* Drap.). 2—Putney (E.S.); 7—Dorking (E.S.); 8—Haslemere and Shottermill (C.P.); 9—Epsom, Mickleham (E.S.); Croydon (S.G., 1883, p. 212); 10—Limpsfield (S.G., 1887, p. 139); Reigate (S.L.E.S., 1894, p. 87).

v. **albina** Moq. 8—Haslemere (High Lane) (C.P.).

C. rolpheii Gray. 9—Dorking (S.G., 1885, p. 19); 10—Limpsfield (S.G., 1887, p. 139); Reigate.

C. biplicata (Mont.). 2—Putney (K. McK.); Mortlake (E.S.); 8—Shottermill (an immature specimen found on the Hindhead road is the first record for this district—vide note in *Naturalists' Journal*, Sep., 1901, and *antea* p. 121 (C.P.)).

monst. **tridentatum** (?) 1—Thames (T. D. A. Cockerell in S.G., 1890, p. 5).

C. laminata (Mont.). 1—Polesden (E.S.); 8—Punch Bowl (E.W.S.); 9—Croydon (S.G., 1883, p. 212); Epsom (E.S.); 10—Limpsfield (S.G., 1887, p. 139).

v. **pellucida** Jeffr. 9—Epsom (E.S.).

v. **albina** Moq. 9—Epsom (Langley Bott) (E.S. and C.H.D.)

Azeca tridens (Pult.). 9—Headley (E.S.); 10—Dorking to Reigate (S.G., 1885, p. 19).

v. **crystallina** (Dup.). 10—Reigate (Cockerell, S.G., 1885, p. 19).

Cochlicopa lubrica (Müll.). 1—Ockham (S.L.E.S.); Polesden (E.S.); 2—Richmond (Garner); Putney (E.S.); Barnes Common (C.H.D.); 6—Guildford (C.P.); 8—Haslemere, Shottermill (C.P.); 9—Croydon (S.G., 1883, p. 212); Epsom (E.S.); Gatton (K.McK.); Winders Hill, Tadworth (K.McK.); 10—Limpsfield (S.G., 1887, p. 139).

Cæcilioides acicula (Müll.) 8—Haslemere (Five individuals were found at the base of an old wall, in the exposed end about two feet below the surface of the ground during excavations) (C.P.); 9—Croydon (K.McK.).

Stenogyra goodalli (Müll.). 9—Birdhurst (K.McK.).

Succinea putris (L.). 1—Byfleet, Ockham (E.S.); Wisley (S.L.E.S.); 2—Putney (E.S.); Richmond (Garner); Barnes (C.H.D.).

S. oblonga Drap. (C.).

S. elegans Risso. 1—Byfleet (E.S.); Ockham (S.L.E.S., 1899, p. 100); 2—Putney (K.McK.); 8—Haslemere (C.P.); 9—Waddon (K.McK.); 10—Nutfield (K.McK.).

Carychium minimum (Müll.). 2—Richmond (Garner); 8—Haslemere (C.P.); Punch Bowl, Grayswood (E.W.S.); 10—Reigate (R.A.B.).

Segmentina nitida (Müll.) (= *Planorbis lineata* Walker). 1—Wisley (S.L.E.S., 1895, p. 90); 2—Wandsworth (K.McK.); Barnes Common (E.S.).

Planorbis fontanus (Lightfoot) (= *P. nitidus* Jeffr.). (C.).

P. nautilus (L.). 1—Bookham (S.L.E.S., 1893, p. 130); 3—Mitcham Common (K.McK.); 9—Chipstead (K.McK.); Epsom (E.S.); 10—Betchworth (K.McK.).

P. albus (L.). 1—Ockham (S.L.E.S., 1899, p. 100); Byfleet (E.S.); Wisley (S.L.E.S.); 8—Haslemere, Camels Dale (C.P.); 9—Epsom (E.S.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

v. **draparnaldi** (Shepp.). (K.McK.).

P. parvus Say (= *P. glaber* Jeffr.). (C.).

P. spirorbis Müll. 2—Barnes Common (C.H.D.); 9—Epsom (E.S.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

P. vortex (L.). 1—Ockham (S.L.E.S., 1899, p. 100); Bookham (E.S.); Wisley (S.L.E.S., 1898, p. 88); 2—Barnes (E.S.).

P. carinatus (Müll.). 1—Ockham (S.L.E.S., 1899, p. 100); Byfleet (E.S.); 2—Barnes, Richmond (C.H.D.).

v. **disciformis** Jeffr. 6—Guildford (S.G., 1885, p. 77).

P. umbilicatus Müll. (= *P. complanatus* Jeffr.). 1—Wisley (S.L.E.S., 1895, p. 88); 2—Barnes Common, Richmond (C.H.D.); 6—Shalford (K.McK.); Frensham Gt. Ponds (E.W.S.).

P. corneus (L.). 1—Ockham (S.L.E.S., 1899, p. 100); Wisley (S.L.E.S., 1898, p. 98); 2—Barnes, Wimbledon (E.S.); Richmond (C.H.D.); Kew.

P. contortus (L.). 2—Barnes (E.S.); Richmond (C.H.D.); 6—Frensham Pond (E.W.S.).

Bullinus hypnorum (L.). 1—Wisley (S.L.E.S., 1895, p. 88); Ockham (E.S.); 3—Mitcham (C.H.D.).

Physa fontinalis (L.). 1—Wisley (E.S.); 2—Barnes (E.S.); Richmond (C.H.D.); 6—Frensham Pond (E.W.S.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

P. acuta Drap. 2—Reported by Mr. Edward Step as found at the Kew Gardens. This is hardly a Surrey shell, being evidently an importation from abroad.

Amphipeplea glutinosa (Müll.). 1—Byfleet (E.S.); 2—Barnes Common (S.G., 1885, p. 178).

Limnæa peregra (Müll.). 1—Wisley (S.L.E.S., 1895, p. 90); Ockham (S.L.E.S., 1899, p. 100); 2—Barnes Common, Richmond (C.H.D.); 6—Frensham (E.W.S.); Guildford (C.P.); 8—Haslemere, Shottermill, Witley, Chiddingfold (C.P.); 9—Croydon (S.G., 1883, p. 212); 10—Limpsfield (S.G., 1887, p. 139); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

v. **lacustris** Leach. 6—Frensham (E.W.S.).

v. **ovata** Drap. 8—Haslemere (C.P.).

v. **acuminata** Jeffr. 9—Epsom (E.S.).

v. **lutea** (Mont.). 8—Haslemere (C.P.).

v. **diaphana** Parr. 6—Frensham (E.W.S.).

v. **labiosa** Jeffr. 6—Guildford, R. Wey (C.P.).

monst. **decollatum** Jeffr. 2—Barnes (S.G., 1885, p. 77); 8—Haslemere (C.P.).

A small v. **minor** (?) is found at Haslemere (Dist. 8).

This familiar and common species is distributed everywhere in the ponds, ditches, and running streams of our county. It is variable in form and great difficulty is experienced in doing more than approximating varieties. This will in some measure explain the absence of locality records.

L. auricularia (L.). 2—Richmond (C.H.D.); Barnes (E.S.); 4—Frimley, Basingstoke Canal (K.McK.); 6—Bramley, Surrey and Sussex Canal (K.McK.); 10—Earlswood (K.McK.).

v. **gibbosa** Taylor. 6—Guildford, R. Wey (C.P.).

L. stagnalis (L.). 1—Ockham (S.L.E.S., 1899, p. 100); 2—Putney, Barnes (E.S.); Richmond (C.H.D.); 4—Woking (E.S.); 6—Frensham Pond (E.W.S.).

monst. **decollatum**. 2—Barnes (C. D. A. Cockerell, S.G., 1885, p. 76).

L. palustris (Müll.). 1—Ockham (S.L.E.S., 1899, p. 100); Wisley (S.L.E.S., 1895, p. 88); 2—Putney (S.G., 1885, p. 76); Barnes (C.H.D.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

v. **conica** Jeffr. 2—Putney (K.McK.); R. Thames (S.G., 1885, p. 180).

monst. **decollatum** Jeffr. 2—Barnes (S.G., 1885, p. 76).

L. truncatula (Müll.). 1—Fetcham Common (K.McK.); 2—Barnes Common, Richmond (C.H.D.); 10—Oxted (K.McK.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

v. **minor** Moq. 8—Haslemere (C.P.).

v. **albida** Jeffr. (S.G., 1885, p. 181).

L. glabra (Müll.). 2—Barnes (C.H.D.); 10—Hedgecourt Common (K.McK.).

Ancylus fluviatilis Müll. 2—Barnes (E.S.); 7—Wotton (E.S.); 8—Haslemere, Camels Dale (C.P.); 10—Limpsfield (K.McK.).

Velletia lacustris (L.). 1—Byfleet (E.S.); 2—Leatherhead, R. Mole (K.McK.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

Cyclostoma elegans (Müll.). 1—Ranmore (E.S.); 6—Guildford (C.P.); 9—Caterham (C.H.D.); Croydon (S.G., 1883, p. 212); Epsom, Headley (E.S.); 10—Betchworth (E.S.); Reigate (S.L.E.S., 1895, p. 22).

v. **marmorea** Brown. 6—Guildford (C.P.); 10—Limpsfield.

v. **albescens** Des Moulins. 6—Guildford (C.P.).

Acicula lineata (Drap.). 9—Gatton (K.McK.).

Neritina fluviatilis (L.). 1—Weybridge, R. Thames (K.McK. and J.E.C.); 2—Richmond, R. Thames (C.H.D.).

Viviparus contectus (Millet). 2—Kew Gardens (E.S.); 10—Flandford, near Reigate (Mr. E. Saunders some years ago) (K.McK.).

V. viviparus (L.). 1—R. Wey (K.McK.); Molesey, Byfleet (E.S.); 2—Richmond (E.S.); 4—Basingstoke Canal (K.McK.); Woking (E.S.); 11—Surrey and Sussex Canal (K.McK.).

v. **efasciata**. 1—Richmond.

Bythinia tentaculata (L.). 1—Byfleet (E.S.); 2—Richmond, Barnes (C.H.D.); Putney Heath (E.S.); 4—Woking (E.S.); 8—Haslemere (C.P.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).

- v. rufescens** (?) 11—Aldfold (E.W.S.).
- v. excavata** Jeffr. (K.McK.).
- monst. **decollatum** Jeffr. (K.McK.); 2—Barnes (T. D. A. Cockerell, S.G., 1885, p. 76); 11—Surrey and Sussex Canal (E.W.S.).
- B. leachii** (Shepp.). 9—Croydon (K.McK.).
- Valvata piscinalis** (Müll.). 2—Barnes Common (C.H.D.); 3—Waddon (K.McK.); 9—Epsom Common (E.S.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).
- V. cristata** Müll. 1—Molesey (E.S.); 2—Barnes (C.H.D.); 3—Waddon (K.McK.); 11—Aldfold (E.W.S.).
- Unio tumidus** Phil. 2—Twickenham; 4—Basingstoke Canal (K.McK.).
- v. radiata** Colb. 2—Twickenham (Garner).
- U. pictorum** (L.). 2—Richmond, R. Thames (C.H.D.); 6—Guildford, R. Wey (K.McK.); 10—S. Nutfield, R. Soften (R.A.B.).
- Anodonta cygnea** (L.). 1—Fetcham Common (K.McK.); Wisley (E.S.); 2—Richmond Park (E.S.); 6—Godalming (E.S.); Frensham Pond; 8—Haslemere (C.P.); 10—Reigate, Gatton Park (R.A.B.); S. Nutfield, R. Soften (R.A.B.); Limpsfield (S.G., 1887, p. 139); 11—Aldfold, R. Arun (E.W.S.).
- v. stagnalis** Sow. and **v. incrassata** Shepp. (K.McK.).
- A. anatina** (L.). 2—Twickenham (The Garner); Richmond Park (E.S.); 6—Frensham and Hammer Ponds (E.W.S.).
- v. compressa**. 2—Twickenham (Garner); 10—N. Nutfield (K.McK.).
- Sphærium corneum** (L.). 1—Bookham (E.S.); 2—Richmond (C.H.D.); Barnes (E.S.); 4—Woking (E.S.); 9—Epsom (E.S.).
- S. rivicola** (Leach). 1—Newark Abbey, Weybridge (K.McK.); 11—Near Cranleigh, Surrey and Sussex Canal (K.McK.).
- S. pallidum** Gray (= *S. ovale* Jeffr.). 2—Richmond (C.H.D.).
- S. lacustre** (Müll.). 2—Wandsworth Common (K.McK.); Richmond Park (E.S.); 8—Haslemere (C.P.); Shottermill (E.W.S.); 11—Aldfold (E.W.S.).
- Pisidium amnicum** (Müll.). 8—Haslemere (C.P.).
- P. fontinale** (Drap.). 2—Richmond (C.H.D.); Sheen (E.S.); 8—Haslemere, Shottermill (C.P.).
- P. pusillum** (Gmelin.). 2—Barnes Common (C.H.D.).
- v. obtusalis** (Lam.). 11—Charlwood (K.McK.).
- P. nitidum** Jen. 2—Richmond (C.H.D.); Sheen (E.S.); 11—Aldfold, Surrey and Sussex Canal (E.W.S.).
- P. milium** Held.(= *P. roseum* Jeffr.). 2—Richmond Park (E.S.).
- Dreissensia polymorpha** (Pall.). 1—Junction of the Thames and Wey (K.McK.); 7—Albury, Silent Pool (S.G., 1883, p. 222).

Briefly summarizing these observations it will be noted that the most thoroughly worked districts are numbers 1, 2, 8, 9 and 10, and that numbers 3, 4, 6, 7 and 11 present very poor results. From district 5 I have no returns and the neighbourhood of Egham, Chertsey, etc., would appear to have been unworked or perhaps by collectors to whose notes I have not had access. The slugs have had very scanty attention—the Arionidæ are reported for *three* districts only (8, 9 and 10); the Limacidæ for *five* districts (2, 6, 8, 9 and 10); and the Testacellidæ for only *one* district (9). Variation has had but limited consideration, but that is ground upon which a great number of conchologists tread tenderly and with caution.

HASLEMÈRE, December 9th, 1901.

Report on the Guide Bridge and Dukinfield Ramble, Sept. 7th, 1901.—

This ramble proved a very satisfactory one in every respect, the weather being exceedingly fine. The district worked was from Guide Bridge along the canal to Dukinfield. The canal at the former district was in an extremely dirty condition, being thick with grease and iron rust, which does not, however, prove detrimental to molluscan life, for *Physa heterostrophæ* (Say), one of the attractions of this ramble, was extremely abundant and very fine, thriving fairly well along the walls. *Planorbis dilatatus* was unfortunately out of season, though it was common enough in this locality in the early part of the year. *Hyalinia nitida*, the only land shell taken, occurs along the canal walls, just above the water. On rounding the canal at Dukinfield, the water became a little purer, and further along, it was exceedingly clean, and *Limnæa stagnalis* and *L. peregra* occurred here in profusion, some of them being remarkably fine, especially the latter, which were very large, some of the animals being of a bright yellow colour, contrasting strongly with the olive green colour of others. Another curious fact about them was, when picked up out of the water, they did not retreat within their shells, as usual, but remained extended. To all appearance the shell seemed too small to contain the whole animal. We were successful in obtaining many specimens of *Paludestrina jenkinsi* and *P. taylori*. Whilst collecting in this spot about a week previously, I was fortunate in finding a remarkable *Limnæa*, and was again successful in obtaining another specimen during this ramble. I submitted the first specimen to Mr. Wm. Nelson, who examined it, in conjunction with Mr. J. W. Taylor, and thought it much resembled *Limnæa bulimoides* (Lea), an American species. They were, however, of opinion that at present it would be unwise to consider it as another "introduction." The following species were taken during the afternoon:—

| | |
|--------------------------------|---------------------------------------|
| <i>Limnæa stagnalis</i> (L.). | <i>Sphærium corneum</i> (L.). |
| <i>L. peregra</i> (Müll.). | <i>S. pallidum</i> (Gray). |
| <i>L. palustris</i> (Müll.). | <i>Physa heterostrophæ</i> (Say). |
| <i>L. auricularia</i> (L.). | <i>P. fontinale</i> (L.). |
| <i>L. bulimoides</i> (Lea)? | <i>Bythinia tentaculata</i> (L.). |
| <i>Planorbis corneus</i> (L.). | <i>Valvata piscinalis</i> (Müll.). |
| <i>P. carinatus</i> (Müll.). | <i>Paludestrina jenkinsi</i> (Smith). |
| <i>P. vortex</i> (L.). | <i>P. taylori</i> (Smith). |
| <i>P. albus</i> (L.). | <i>Hyalinia nitida</i> (Müll.). |

J. W. JACKSON (Read before the Society, October 9th, 1901).

REPORT OF THE COMMITTEE APPOINTED TO DRAW UP A REVISED LIST OF BRITISH MARINE MOLLUSCA AND BRACHIOPODA.

The Committee, after correspondence with a number of British and Foreign Conchologists, drew up a List, which was published with an explanatory preface in the Journal for January, 1901.

Since its appearance, the Secretary has received a number of notes, comments and queries from various quarters, but the Committee are glad to find that the objections to the changes proposed in the list are not nearly so numerous as had been anticipated.

The Committee have carefully considered the various suggestions received and have modified, or enlarged, the list where this seemed necessary, and they have now the honour to lay before the Council a list as perfect as it is in their power to prepare.

The British area for the purpose of this list has been taken as thus defined by the Rev. Canon Norman (*Ann. and Mag. Nat. Hist.* (6) vol. 5, p. 345, 454, 1890):—

South—By latitude $49^{\circ} 30' N.$, which parallel passing eastwards terminates at longitude $5^{\circ} 0' W.$, or midway between the Land's End and Brest. Thence mid-Channel is followed until latitude $51^{\circ} 50' N.$ is reached off the east coast.

East—From latitude $51^{\circ} 50' N.$, longitude $2^{\circ} 30' E.$ is taken as the eastern boundary northwards.

North—Latitude $60^{\circ} 0' N.$, coming from the west as far as longitude $5^{\circ} 0' W.$, thence due north-east to longitude $1^{\circ} 0' W.$, thence due east to meet the eastern boundary at $2^{\circ} 30' E.$

West—Down to the base of the continent at 1,500 fathoms.

The only alteration made by the Committee has been a detour of the southern boundary to include the Channel Islands.

In the matter of classification the Committee have not followed any individual system, but have endeavoured to adopt the most recent views of specialists in each department. In the vexed question of Nomenclature it has been judged best to follow the rules of the International Zoological Congress. This has involved the adoption of the tenth edition of the "Systema Naturæ" of Linné as the starting-point of binomial nomenclature. This last determination has been the cause of the majority of the changes which will be found in the List. Authorities for species which have since their creation been transferred to different genera are given in parentheses.

Since Jeffreys' "British Conchology" still necessarily forms the text-book of our collectors, it has been thought advisable in those cases where the name adopted in this list differs from that used by Jeffreys to give the latter in square brackets: thus—

Pteria Scopoli [=Avicula].

A few other synonyms have been similarly inserted.

When a variety only, and not the typical form of the species, is British, the name of the latter is placed in parentheses: thus—

(*clavatus Poli*).

v. dumasi Payraudeau

The names of a few species whose claims to be regarded as British are very doubtful have been placed in square brackets: thus—

[*islandicus Müller*].

A number of varietal names, apparently based merely on monstrous, stunted, aborted, or young specimens, have been omitted.

The Committee have to acknowledge the kind assistance of the following gentlemen:—Messrs. L. St. G. Byne, W. H. Dall, J. T. Marshall, R. B. Newton, E. A. Smith, R. Standen, E. R. Sykes, B. B. Woodward, and the Rev. Canon A. M. Norman. These gentlemen must not, however, be held responsible for any of the shortcomings of the list.

The Committee have found the amount of agreement between different authorities greater than had been anticipated, but there are still many questions on which the discrepancies of opinion seem to be irreconcilable.

The Committee do not imagine that the present list can be regarded as final, but if they have succeeded in producing a document which will be a help to students of conchology the object of their appointment will have been fulfilled.

The following are the corrections to be made in the list already published, together with a few explanatory notes on questions regarding which differences of opinion have arisen.

The numbers refer to the species in the list; genera are referred to by the number of the first species. The fact that the old Linnean genus *Chiton* is broken up by writers of such eminence as Pilsbry and Simroth into several families is sufficient to show that its divisions are at all events of generic value.

- 25 The type of *Nuculana* Link is *N. rostrata*, a true **Leda**, and therefore as this name precedes *Leda* of Schumacher it is entitled to stand.
- 59 **Pristigloma** Dall, because *Glomus* is preoccupied.
- 61 For **Modiolus** Lamarck substitute **VolSELLA** Scopoli, which has the same type (*Mytilus modiolus* L.), and is prior in date of creation.
- 65 This species was placed by its describer in *Myrina*, but as that name is preoccupied the next available, viz. *Adula* H. & A. Adams, has been adopted.
- 76 Pennant's species is clearly figured and unmistakable, whereas it is extremely difficult, if not impossible, to determine to which of the Linnean species the British form is to be referred; hence it is not advisable to use the term *rudis*.
- 108 The shell is called *Cardium humanum* in the tenth edition of Linné. It was altered to *Chama cor* in the twelfth, but in accordance with the principles mentioned above the earlier name has been adopted.
- 109 For **Arctica** Schumacher read **CYPRINA** Lamarck; the former name being preoccupied for a Bird.
- 114 For **Cryptodon** read **Thyasira** Leach in Lamarck (see Dall, *Proc. U.S. Nat. Mus.*, vol. 23, p. 784, 1901); this genus includes nos. 114-118, and 120. Add **Leptaxinus** Verrill & Bush to include nos. 119 and 121.
- 131 **Lasæa** Leach in Brown.
- 139 *turtoni* Sowerby. The editors of the *Zoological Journal* at this time were Bell, Children and J. de C. and G. B. Sowerby. As the last two were the conchological members of the group it seems reasonable to credit them with the description of this species.
- 174 **TIMOCLEA** Leach in Brown.
- 175 **CHAMELEA** H. & A. Adams, Klein being pre-Linnean.
- 195 **Gari** Schumacher has precedence of *Psammobia* Lamarck by one year. Above this insert the family name "GARIDEÆ."
- 197 For *v. pallida* Marshall read *Cockerell*.
- 205 **Pharus** Leach in Gray.
- 216 **Barnea** Leach in Risso.
- 218 **Zirphæa** Leach in Gray add [= *Pholas*]
- 233 **Martesia** striata to precede **Pholadidea** loscombiana.
- Martesia** Leach in Blainville.
- 239 **Thracia** Leach in Grayville.
- 267 For evidence see Jeffreys, *Proc. Zool. Soc.*, 1882, p. 657.
- 274 Delete "*v. depressa* Pennant," and insert as a species. *depressa* Pennant [= *athletica*].
- 275 For **Patina** Leach in Gray read **Helcion** Montfort. The British form does not seem to be generically distinct from Montfort's type *Patella pectinata* Born.
- 285 Delete "Emarginula elongata."
- 326 Delete "*v. clausa* Jeffreys."
- 346 **Zippora** Leach in Gray.
- 357 **Assimineæ** Leach in Fleming.
- 359 *stagnalis* (Baster) not *Basterot*.
- 371 add [= *truncatula*].
- 381 **Natica** catena *v. leckenbyi*, for evidence see *Ann. Nat. Hist.* (4) vol. 16, p. 393, Dec., 1875.
- 467 *Jeffreys* in *Monterosato*.

- 468 Here insert :
anceps *Marshall*.
- 471 Here insert :
petitiana *Brusina*.
- 487 *Cassidaria* [echinophora]; see *J. Conch.*, vol. 7, p. 381, 1894.
- 496 After Mörch add [= *Fusus*].
The generic name *Fusus* does not occur because all the British forms have now been separated into other genera.
- 511 For evidence see Wyville Thomson, "Depths of the Sea," p. 86.
- 522 *Bela* *Leach in Gray*.
- 535 *costata* not *ecostata*.
- 542 Reduce *THESBIA*, *PLEUROTOMELLA*, *TERES*, and *BELLARDIELLA* to the rank of subgenera.
- 569 *Haminea* *Leach in Gray*.
- 570 *Roxania* *Leach in Gray*.
- 577 *punctata* (*J. Adams*).
- 592 *Oscanius* *Leach in Gray*.
- 700 *Alexia* *Leach in Gray*.
denticulata *Montagu* [= *myosotis* v. *ringens*].
v. *myosotis* *Draparnaud*.
- 718 For **OCTOPODIDÆ** read **POLYPODIDÆ**.
Polypus *J. G. Schneider* [= *Octopus*].
- 720 *Moschites* *J. G. Schneider*
[= *Eledone*.]

Report on the Marple Ramble, July 27th, 1901.—Marple has, apart from its scenic beauties, for many years past been a favourite hunting ground of the Manchester naturalists, and conchologists especially have found the calm basins of the canal locks, fringed and in some cases, partially overgrown with reeds, the damp shady woods, and river banks, most prolific in molluscan life—about fifty species having been recorded from the district. It was here that the late Mr. Thomas Rogers first discovered *Hyalinia glabra*, and this alone gives, and will continue to give, a peculiar interest to the locality. The party proceeded along the canal banks in the direction of Romiley, crossing and passing underneath the aqueduct bridge, along the banks of the Goyt, and thence through the fields and woods to Compstall. In spite of the long drought many shells were obtained, and the canal yielded practically all the species hitherto recorded in the pages of the *Journal*, which it is scarcely necessary to recapitulate. *Helix nemoralis* and *H. arbustorum* still exist, but in yearly diminishing numbers, doubtless owing to the poisoning of the herbage by smoky rain, and the ravages of Thrushes and Field-mice. Judging from the quantity of nibbled shells found in the runs of the field-mice, these little rodents must destroy great numbers of snails in the course of a season. It was noted with much satisfaction that a colony of *H. hortensis* had become established in an extensive patch of nettles and willowherb, which has for years been known as the home of *H. nemoralis*, but this species has almost disappeared and is apparently being supplanted by its smaller congener. The colony of *H. hortensis* is principally composed of very beautiful forms of v. *coalita* and v. *arenicola*, with a few of the type. Both species were found burrowing deeply into the soil, and in the act of depositing eggs. All the *Hyaliniae* occur, some species in fair numbers, but it is noticeable that *Bulimus obscurus*, *Clausilia perversa*, *Cl. laminata*, *Pupa anglica*, *P. cylindracea*, *Vertigo edentula*, *Helix fusca* and *H. aculeata* are not nearly so abundant as formerly, although fair series of each of these may still be procured by careful search under suitable conditions, and at the proper season.—R. STANDEN (*Read before the Society*, October 9th, 1901).

SOME UNDESCRIBED VARIETIES OF *CYPRÆA*.

BY MRS. AGNES KENYON.

(Read before the Society, Jan. 8, 1902).

HAVING thought it well to bring under the notice of the scientific world some varieties of *Cypræa* hitherto unnoticed, I wish to draw attention to the following:—

***Cypræa tigris* L. v. *lineata* nov.** Fiji. Differing from the type in possessing a number of hair-like lines, passing longitudinally across the dorsal surface, from the anterior to the posterior extremity. I do not think these can be lines of growth, as I have one specimen in which the lines are transverse, but do not extend over the whole surface; also three specimens and several others not so fine or distinctly marked.

***C. mappa* L. v. *viridis* nov.** New Caledonia. Two uncommon varieties, one with the dorsal surface suffused with a greenish tint, base coloured rose pink, columella side adorned with central brownish blotch; in another specimen both dorsal surface and base are coloured green, especially the base which does not show any blotch. Another specimen from Maldon Island shows a rich dark brown dorsal surface relieved by the usual markings. The margins are adorned with large black spots, which also encroach on the sides of the shell; the spotting is similar to the marginal spots of some specimens of *C. tigris*: there is a dark basal blotch.

***C. bregeriana* Crosse v. *barbara* nov.** New Caledonia. Shell differing from *C. bregeriana* in the fineness of the dentition and without the violet coloured interstices, interior lined with white, not violet purple as in *C. bregeriana*. The shape is not pyriform but straitened and more cylindrical, dorsal surface depressed and sculpture adorning it consisting solely of the embedded white spotting, which extends in unbroken continuity over the entire surface of the shell. Margin maize or saffron coloured, having brownish blotch on the centre of the labium. Dorsal surface light cream colour. The type specimen unfortunately was not a living one and the dorsal surface is somewhat eroded, but portions remain entire. There is a very obvious divergence from *C. bregeriana* (in which the embedded white specks are confined to the margins and the dorsal surface is thickly covered by olive brownish freckles on a greenish-tinted ground, and the centre darkly banded across, the margins are more or less plentifully sprinkled by large dark coloured spots, extremities also spotted). A good illustration of *C. bregeriana* is given in 'Thes. Conch.,' figure 536. The dissimilarity of this variety is therefore very apparent.

***C. helvola* L. v. *borneensis* nov.** Borneo. Shell differing from *C. helvola* in being smaller in size and having narrower sides, not

incrassated or angulated, dorsal surface reddish pink sprinkled with white, sparsely overlaid with brown spotting, base and extremities white, young specimens reddish pink unspotted. A subvariety is of a faint lilac or lavender hue, spotted with white, base slightly tinged with yellow, young specimens unspotted. It is an extremely rare variety.

C. helvola v. **timorensis** nov. Timor Island, vicinity of N.W. Australia. Shell differing from *C. helvola* in having white, not lilac, extremities which are calloused, twin callosities at the posterior extremity, dentition, dorsal surface and base same as in type.

C. poraria L. v. **vibex** nov. New Caledonia and New Hebrides. Type specimen of considerably larger size than normal examples of *C. poraria*, and distinguished by a white porcellaneous band or stripe not raised but showing quite distinctly, stretching from one extremity to the other, thus dividing the dorsal surface into two equal parts. Some years ago I received from the New Hebrides a specimen of the usual size and appearance of *C. poraria*, except for the distinctive band, and several shewing the band half completed, *i.e.*, in the exact centre but abruptly curtailed and not reaching to the extremities, at that time I was inclined to consider this as merely a freak of nature, but now having received so magnificent a specimen from New Caledonia, thus evidencing its existence in two different localities, I think it should be classed as a variety.

C. miliaris Gmelin v. **diversa** nov. Sharks Bay, West Australia. Shell as in type but scarcely so rotund. Specimens very light in colour, almost white but shewing spotting perfectly; they are quite distinct from *C. eburnea* Barnes, the teeth are not so coarse, the enamel of the dorsal surface is not so shining, the interior is coloured pink or pale violet, while the interior of *C. eburnea* is either white or orange; the specimens are comparatively small. I think the discovery of this variety proves the complete separation of the two species *C. eburnea* and *C. miliaris*.

C. carneola Reeve v. **rubiola** nov. Hawaiian Islands. Shell resembling type specimens as nearly as possible (where there exists such variety in form, colour and sculpture) except in colouration of teeth which are bright rose pink in contradistinction to the purple hued dentition of *C. carneola* or the colourless base and dentition of *C. læbbeckiana* Weinkauff, which *Cypræa* almost approximates to the distinction of shape which exists between *C. exusta* and *C. talpa*, the ends being more produced, the dentition finer, the shape more pyriform than that of *C. carneola* and the dorsal surface most frequently unicoloured, the cornelian bands being absent from *C. læbbeckiana* or shewing so faintly as to be almost invisible. I have a number specimens, one or two only with bands of colour.

A FEW NOTES ON IMPORTED MOLLUSCA.

BY W. A. GREEN.

COMMUNICATED BY R. WELCH.

(Read before the Society, February 12, 1902).

THE introduction of mollusca from various places on imported goods is a branch of conchological investigation that well repays the student for the time devoted to it. By this means we come across shells that would otherwise be unknown to us, and we are also able to form an idea of at least a possible means by which new species turn up from time to time in various parts of the country.

In the midst of my daily labours I occasionally find time to glance at a case of Californian apples being opened, or the unpacking of a bunch of bananas for the sake of beetles, spiders, etc., that are constantly found lodged among them.

The latter, however, are usually the most productive, when the living shells contained in the refuse, left over from the processes of cleaning foreign fruit, have been conveyed by farmers and gardeners who purchase it for manure.

Helix pisana has reached me by this means. One specimen almost full grown and several smaller ones, but in all cases alive.

Adams, I find, only records it for Cornwall in England, the southern counties of Wales, and in Ireland, the east coast extending from about Drogheda to Rush, so that in Belfast we may look upon it as an occasional visitor.

Helix guamartemes Grass., as Dr. Scharff has kindly named it for me, is in his opinion limited to the El Monte district on the island of Gran Canaria.

Helix carthusiana appears to have been introduced into Belfast with currants from Greece. I understand that after the currants are pulled they are spread out to dry in the sun, presumably on the bare ground. When this has been accomplished they are shovelled into boxes with sand, small pebbles, shells and other foreign substances. In this manner they are shipped for the English market, and it is almost needless to say, therefore, that currants have to undergo extensive cleaning operations before being sold.

Helix pyramidalis is the name given by Dr. Scharff to a shell which I had in my collection labelled *H. virgata*. He tells me that it is frequent along the coast of the Mediterranean and occurs with the shell before mentioned. These examples were imported in dried sultana raisins from Turkey in Asia.

Shells are much more frequent in the sultanas than in currants, although the former arrive perfectly clean and require no washing.

This, coupled with the fact that they are usually alive; whilst those in the currants are invariably dead, leads me to suppose that they have a partiality for trees and possibly rest on the sultana vines, whence they are pulled off and packed with the fruit, instead of being gathered up off the ground like the foregoing species. One specimen shows the epiphragm just as it was when picked out of the sultana box. I obtained about one dozen specimens altogether, mostly of the tessellated variety which Adams names *radiata* in his account of *H. virgata*, and all, without exception, constant in having a dark nucleus. The shell is much more pyramidal in shape than *H. virgata* and the base is flatter.

Physa acuta, which has made itself at home under similar circumstances at Kew, was found inside one of the houses in the Dublin Botanic Gardens. It is almost impossible to say definitely what part of the globe these specimens may have come from, as the tanks are stocked with lilies from so many different places. I think it most likely, however, that this one came with the Victoria Regia lily from Brazil, but as Mr. McArdle informs me that these plants have been a long time in cultivation it seems strange that the shell has never been noticed before.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

306th Meeting, January 8th, 1902.

Mr. J. Cosmo Melvill in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

Candidates Proposed for Membership

Mr. Walter J. Hall ; Mr. J. T. Wadsworth.

Resignation.

Mr. W. J. Jones, Jr.

Member Deceased.

Lieut.-Col. C. E. Beddome, on September 1st, 1898.

Papers Read.

"Some varieties of *Cypræa*," by Mrs. Kenyon.

"Buckinghamshire Mollusca : New Records," by Alfred Leicester.

Exhibits.

By Mr. F. F. Laidlaw : New species of *Opisthostoma* and *Raphaulus* from Malay Peninsula.

By Mr. F. Taylor : *Hydrobia steini* v. Mts., from Denmark, for comparison with *Paludestrina taylori* Sm.

By Mr. J. Cosmo Melvill : On behalf of Mrs. A. Kenyon, a large number of *Cypræa*, including the species mentioned in her paper, and many other forms of more or less interest.

By Mr. W. Moss : A collection of land and freshwater shells from Barbados, collected by Mr. L. B. Brown, and including twenty-one out of the thirty-one species as yet recorded for the island, and some small species not yet identified.

307th Meeting, Feb. 12th, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted:

"Land und Süßwasser conchylien von Ukerewe, etc." by Dr. E. von Martens.
 "Sur l'organisation interne du *Pleurotomaria beyrichi*," by E. L. Bouvier and H. Fischer.
 "On two new and three hitherto unfigured species of *Plectopylis* from Tonkin," by G. K. Gude (*from the authors*); and the usual publications received in exchange.

New Members Elected.

Walter J. Hall, Manchester Museum, Owens College, Manchester.

John T. Wadsworth, 15, Deramore Street, Moss Side, Manchester.

Candidate Proposed for Membership.

Mr. Ernest Pattison.

Papers Read.

"Note on the Drying of Chitons," by J. G. Edwards.

"A few notes on Imported Mollusca," by W. A. Green, communicated by R. Welch.

Exhibits.

By Mr. B. R. Lucas: *Clausilia dorri*, *Cl. giardi*, and *Pterocyclos nambuensis*, from Tonkin; *Jullienia harmandi*, *J. nodata*, from Mekong; and *Amphidromus perversus*, from Pulo Condore.

By Mr. R. Standen: *Chiton (Craspedochilus) cinereus*, from Colwyn Bay, illustrating the method of tying the specimens, as collected, in order to prevent their curling up.

On behalf of the Manchester Museum a number of Cuban Helicidæ were exhibited, and Mr. Edward Collier also shewed his collection, including beautiful series of the section *Polymita*, a group which is peculiar to the island, and includes the varied and brilliantly coloured *Helix picta*.

In illustration of Mr. Green's paper on "Imported Mollusca," a number of lantern slides were exhibited.

308th Meeting, March 19th, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted:

"A revised census of the Marine Mollusca of Tasmania," by R. Tate and W. L. May; "On the genus *Acavus* Mont.,"; "On *Despina cinnamomea* n. sp.,"; "Non-Marine Mollusca of Norfolk and Philip Islands"; "Notes on the genus *Temesa*,"; and "Zoological Record for 1900, Mollusca and Brachiopoda," by E. R. Sykes (*from the respective authors*).

Donations to the Cabinet announced and thanks voted:

Specimens of *Lima bians* from Millport, from the President; the specimens illustrating the new records mentioned in Mr. Whitwell's paper, from the author.

New Member Elected.

Ernest Pattison, 52, Regent Road, Leicester.

Papers Read.

"*Tapes geographicus* and *T. pullastra*," by J. T. Marshall.

"A final note on *T. geographicus*," by B. B. Woodward.

"New Records for Surrey and East Sussex," by W. Whitwell.

Exhibits.

A series of thirty species of *Odontostomus* was exhibited by Messrs. Collier, Hardy, Melvill, Standen and the Manchester Museum, including *O. leucotrema* Beck, *O. janeirensis* Sowerby, *O. bahiensis* Moricand, *O. aconyigastanus* Dohrn, *O. champaquianus* Doering, *O. pucaranus* Doering, *O. riojanus* Doering, *O.*

alvaresii d'Orb., *O. subsexdentatus* Doering, *O. salinicola* Doering, *O. bergii* Doering, *O. martensii* Doering, and *Anctus laminiferus* Ancey.

By Mr. J. W. Baldwin: A thin shelled form of *Helix nemoralis* from Douglas, Isle of Man.

The Donations to the Cabinet above mentioned.

Exhibits for Next Meetings.

It was decided to hold the following:—

| | | | | |
|-----------|---|---|---|-----------------------|
| April 9th | - | - | - | Sphærium and Pisidium |
| May 14th | - | - | - | Placostylus |
| June 11th | - | - | - | Hyalinia |

Members are requested to send specimens for exhibition and comparison.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Journal of Malacology, vol. 8, no. 4, Dec. 30, 1901.

"On some Land Shells from British East Africa" [*Ennea ugandensis*, *Martensia permanens*, *Limicolaria dohertyi*, *Opeas crenulata*, nn.spp. figd.], by E. A. SMITH. "The Anatomy of the British Species of the Genus *Solen*" [with pl. 8], by H. H. BLOOMER. "Descriptions of Five New Species of Shells," by G. B. SOYVERBY [*Conus beddomei*, *Pisania delicatula*, *Vanikoro expansa*, *Mangilia eudeli*, *Cardium hungerfordi*, figd.]. "Descriptions of New Species of *Xesta*, *Amphidromus*, and *Cyclostoma*, from Madagascar and Perak" [*X. piperata*, *A. perakensis*, *C. sikore*, figd.], by H. FULTON. "Malacological Notes," by E. R. SYKES [*Cyclostoma giganteum* shown to be really three species, for one of which the new name *Aperostoma confusum* is proposed. *Voluta beauri* figd.; *Cypræa exusta* = *C. talpa* var.; *Murdochia* Ancey = *Cytora* Kob. & Mliff.]. "On two New and three hitherto unfigured Species of *Plectopylis* [*P. pilsbryana*, *P. hirsuta*, *P. moellendorffi*; several other spp. figd.] from Tonkin," by G. K. GUDE. "Description of some New Species of Slugs collected by Mr. H. Fruhstorfer," by W. E. COLLINGE [*Myostesla* n.g. for *M. fruhstorferi* and *M. punctata* nn.spp., Tonkin, *Philomycus fruhstorferi* Japan, *P. dendriticus* Tonkin, nn.spp. *Microparmarion brunneopallescens* Annam, *M. annamica* n.n. for *M. andamanica*, *Veronisella fruhstorferi*, *V. himerta*, nn.spp., Tonkin]. "Notes on two Californian Nudibranchs" [*Coryphella iodina*, *Hermisenda opalescens*], by T. D. A. COCKERELL. "*Physa heterostrophia* Say, in South Staffordshire," by JOHN LINTON. "*Amalia gages* Drap., at Sutton Coldfield," by H. OVERTON. "*Limax maximus* L., at Los Angeles, California," by T. D. A. COCKERELL.

The Nautilus, Dec., 1901-March, 1902, vol. 15, nos. 8-11.

"Land Shells of Fortune Island, Bahamas," by J. B. HENDERSON, JR. [4 spp. annotated]. "Collecting Shells in Montana," by M. J. ELROD. "A New Species of *Liomesus*" [*L. nassula* Behring Sea], by W. H. DALL. "A new *Tethys* [*T. ritteri*] from California," by T. D. A. COCKERELL. "Japanese *Vivipara* [*V. stelmaphora*] in California," by R. E. C. STEARNS. "The Shell-bearing Mollusca of Rhode Island," by H. F. CARPENTER [continued].

"A Day on the Great Barrier Reef," by C. HEDLEY. "A New Species and Subspecies of Jamaican *Pleurodonte*" [*P. vacillans*, *P. soror* v. *peracuta*], by H. VENDRYES. "A New Species of *Volutomitra*" [*V. alaskana*], by W. H. DALL.

"Notes on *Ashmunella*," by T. D. A. COCKERELL and MARY COOPER [Comparison of *A. thomsoniana* and *A. porteri*]. "Description of a New *Unio* from Tennessee," by W. A. MARSH [*Quadrula andrewsii*]. "Notices of New Japanese Land Shells," by H. A. PILSBRY [*Chloritis perpunctatus*, *Gansella sororcula*, *G.*

optima, *Macrochlamys cerasina*, *Eulota cavicornis*, *Mandarina exoptata*, *Microcystina hahajimana*, nn.spp., *Hirasea* n.g. for *H. nesiotica*, and *H. chichijimana* nn.spp.]. "*Helix aspersa* increasing in California," by J. KEEP.

"A Revision of the Carinate Valvates of the U.S.," by B. WALKER [3 spp. described and annotated]. "*Pisidium strengii* n.sp." [Michigan, N.Y., Ohio, and Indiana], by V. STERKI. "Note on the Names *Elachista* and *Pleurotomaria*," by W. H. DALL. [*Alabina* proposed for the former]. "The original locality of *Limnea ampla* Mighels" [Mud Lake or Second Lake, Maine], by O. O. NYLANDER. **Proceedings of the Academy of Natural Sciences of Philadelphia**, vol. 53, part 2, April-Aug., 1901.

"New Land Mollusca [14 spp.] from Japan and the Loo Choo Islands," by H. A. PILSBRY. "New Japanese Marine, Land and Freshwater Mollusca," by H. A. PILSBRY [22 spp., mostly figd.]. "The Land Mollusks of the Loo Choo Islands: Clausiliidae," by H. A. PILSBRY [11 spp., belonging to five different sub-genera; they indicate affinity with the Japanese fauna]. "Additions to the Japanese Land Snail Fauna, IV.," by H. A. PILSBRY [3 nn.spp., with figures of many others]. "Notices of [13] New Land Snails from the Japanese Empire," by H. A. PILSBRY. "*Cymbulioopsis vitrea*, a New Species of Pteropod," [from Monterey Bay, Cal.], by H. HEATH and M. H. SPAULDING.

Records of the Australian Museum, vol. 4, no. 5.

"A New Permo-Carboniferous Genus (*Keeneia*) of Pleurotomariidae, and a *Straparollus* in New South Wales," by R. ETHERIDGE, Junr. "Two undescribed Pelecypoda from the Lower Cretaceous of Queensland in the Collection of the Australian Museum," by R. ETHERIDGE, Junr.

The Irish Naturalist, vol. 11, nos. 1-3, Jan.-March, 1902.

"New Locality for *Paludestrina jenkinsi*" [Ben Head, Co. Meath], by Miss A. L. MASSY. "Marine Mollusca at Port Stewart," by R. WELCH [8 additions to list published by Rev. G. A. Frank Knight]. "Additions [14] to the List of Mollusca of Clonbrock," by R. WELCH. "Eggs of *Arion hortensis*," by R. WELCH [oviposition observed]. "Mollusca from Shell-Marl," by R. WELCH.

Transactions and Proceedings of the Royal Society of South Australia, vol. 25, part 2, Dec., 1901.

"Fossil Polyplacophora from Eocene Beds of Victoria," by E. ASHBY and W. G. TORR. "On the Occurrence of Miocene Limestones at Edithburgh and their Stratigraphical Relationship to the Eocene of Wool Bay," by H. BASEDOW, with "Description of a New Species [*Tellina basedowi*]," by Prof. R. TATE.

La Feuille des Jeunes Naturalistes, nos. 375-377, Jan.-March, 1902.

"Notes de géographie malacologique. — Un mollusque terrestre à grande dispersion; *Pupa* (*Lauria*) *cylindracea* Da Costa (*P. umbilicata* Dorp.)," by E. MARGIER [Scotland and Scandinavia, and Livonia to Morocco and Abyssinia]. "Note géologique, Faunule du Vésulien (Bathonien Inferieur) de la côte d'Andelarre (Haute-Saône)," by P. PETITCLERC.

The Naturalists' Journal, vol. 11, no. 117, March, 1902.

"Stour Provost, Dorset: Mollusca," by E.W.S. [*Arion subfuscus* new to county]. "Sur l'organisation interne du *Pleurotomaria beyrichii* Hilg.," by E. L. BOUVIER and H. FISCHER (*Comptes rendus*, April 1, 1901).

"Einige von Dr. F. Stuhlmann auf der Expedition Emin Pascha's in den Landschaften Ukwere, Ukami, Usagara, und Ugogo gesammelten Land- und Süßwasser-Conchylien," by E. v. MARTENS [*Buliminus trichrous* n.sp., 2 nn.varr.] (*Ges. naturf. Fr. Berlin*, 1891, no. 1).

"A Revision of the *Limnæas* of Northern Illinois," by F. C. BAKER [9 spp. and several sub.-spp. recognized, figured on plate and woodcuts] (*Trans. Acad. Sci. St. Louis*, vol. 11, no. 1),

ADDITIONS TO "BRITISH CONCHOLOGY."

(Continued from page 128).

By J. T. MARSHALL.

Eulima bilineata Alder (*continued*).

Var. **albida** Marsh. n.var.—Ground colour of the shell whitish, without coloured bands. I have this from the Scilly Islands, 40 f., and N. Rona Island, 24 f.; Adventure Bank, Mediterranean, 92 f. ("Porcupine")! and the same district in 120 f. ("Shearwater")!

Var. **exigua** Marsh. (*J. Conch.*, vol. 7, p. 258, 1893).—In this variety, which is found only occasionally with the type, the spire is proportionally slimmer, more so than a young *E. subulata* of the same size. A figure of it will be found in "British Mollusca" (pl. 92, fig. 9). It differs from *E. jeffreysiana*, which is of similar size and proportions, in that the latter is more regularly conical in the spire, more pointed in the base, and without bands. Var. *exigua* was dredged by the "Porcupine" off the Island of Pantellaria in 390 f., and by the "Sylvia" in the Straits of Korea in 20 f. *E. subulata* has a corresponding form (var. *nana* Jeffr.), but that is not found on the British coasts.

Natica Adans.—All the species of British Naticidæ have a horny operculum with the exception of *N. affinis*, in which it is calcareous; in all the sexes differ, and are easily recognisable, the males having a smaller body-whorl, a narrower mouth, and a more produced spire.

N. islandica Gm.—St. Andrews (M'Intosh); Sutherlandshire, from fish stomachs (Baillie)! Doggerbank, 40 miles N.E. by E. from Scarborough, 35 f.; West Orkneys, 45 f.; and North Rona, 24 f.

Specimens from the Shetlands belong to the Arctic form, and are considerably larger and have a more elongated spire than those from other parts of the British coasts and from the Crag formation; the usual size of the two latter is half-an-inch in length. Jeffreys figures the Shetland form, and Sowerby the more usual British coast one.

N. grønlandica Beck.—Aberdeenshire (Simpson)! 50 miles off Peterhead ("Triton")! Doggerbank, 30 miles off Scarborough, not uncommon.

This species is globosely oval, and always longer than broad. Both Jeffreys' and Sowerby's figures indicate the shell of the female, while Forbes and Hanley figure a half-grown specimen of the male. I described the animal in 1875.¹

N. sordida Phil.—St. Bride's Bay, very fine (Wilkinson)! Sutherlandshire, from the stomach of a haddock (Baillie)! The colour of this species is every shade of brown, but specimens from Fetlar Island are fawn-coloured.

¹ "North Sea Dredging," *Ann. and Mag. Nat. Hist.*, ser. 4, vol. 16, p. 393, 1875.

Some of the specimens from St. Bride's Bay are intermediate between this species and the next ; they have the characteristic umbilicus of *N. sordida*, but are greyish, thin, and globular, with convex whorls, like *N. catena*. I have great doubts about Mr. Clark's Exmouth record for this species.

N. catena DaCos.—The ground colour of this shell is cinereous or dove-colour, passing into buff of various shades. Those from the Channel Islands are cinereous, while those from the west of Ireland are a bright buff, very large and solid.

Var. **leckenbyi** Marsh.¹—Aberdeenshire (Simpson) ! Doggerbank, 10 f. This can easily be mistaken for the globular form of *N. sordida*, previously mentioned, but the umbilicus is very different.

Var. **conico-ovalis** Jeffr.—Herm Island and Torbay.

N. glaucina L.—Ground colour variable, white, pink, fawn, or buff of various shades. The name—*glaucina*—is not very apposite.

Var. **lactea** Jeffr.—Scilly (Smart and others); Aberdeenshire (Simpson) ! Guernsey and Herm ; Milford Haven.

Var. **subovalis** Jeffr.—Aberdeenshire (Simpson) ! Herm Island, Scilly, Milford Haven, and Bantry Bay. Not always fawn-coloured. This and the previous variety are well figured in "British Mollusca" as unnamed varieties of *N. nitida*. This one resembles *N. macilenta* Phil., but the umbilicus is different.

Var. **ventricosa** Jeffr.—Birterbuy Bay (Walpole).

This species has a wide variation in shape, size, markings, and length of spire. Dredged specimens are much smaller than those living between tide-marks. A large form from Torbay has a produced spire and rounded whorls, resembling a half-grown *N. catena* var. *conico-ovalis*; and a monstrosity from Guernsey is compressed and elongated. It is abundant near low-water mark at Herm, and on a hot day, on the return of the tide, they spring out of the sand faster than they can be picked up ; on one occasion I gathered quite a pint in this way. The authors of "British Mollusca" record "a fine example, ten lines in length by two less in breadth," but this must be erroneous, and it was more probably an example of *N. catena* var. *conico-ovalis*.

N. montacuti Forb.—10 to 140 fathoms. Off Fermain Bay, Guernsey, 18 f., a single specimen in 1874 ; Scilly Islands, rare.

Var. **albula** Jeffr.—Doggerbank, 40 f. ; the Minch, 30 f. ; West Orkneys and East Shetlands.

Var. **conica** Jeffr.—Doggerbank, 40 f. ; the Minch, 30 f. ; Aberdeenshire, West Orkneys, and East Shetlands.

The last two varieties are sometimes combined in one form. Two unnamed varieties from the Shetlands correspond to the vars. *subovalis* and *ventricosa* of *N. glaucina*. I have a monstrosity from Lamlash

which is compressed, like *Helix obvoluta*, the spire being quite flat and the umbilicus considerably expanded. Another from the same ground has a barnacle as large as itself attached to it. On some dredging-grounds the surface of the shell is much eroded or pitted, and the spire frequently so.

Jeffreys' figure is the type, and Sowerby's the var. *conica*, but both are too large; four lines in length and breadth is the maximum size, as given by Forbes and Hanley, and their figure is just the thing.

N. affinis Gm.—This species has been dredged well within sight of the British Isles, and is entitled to be considered indigenous (see *J. Conch.*, vol. 7, pp. 258–9, 1893). Var. *elatio* Möll. has been dredged in the Shetland-Færø Channel ("Triton")! It is analogous to *N. montacuti* var. *conica*.

The *N. nana* of Möller resembles the last species in having the umbilicus covered in the adult stage by a shelly pad, but the operculum is horny. Two dead specimens were dredged in the Minch in 80 f. during the "Porcupine" cruise of 1869. It is similar in size and shape to *N. glaucina* var. *subovalis*.

I have a specimen of *Nerita virginea* L., from Guernsey, and Mr. Heathcote another which was dredged at Port Erin, Isle of Man. It is West Indian.

Two living specimens of *Solarium siculum* Cant. were dredged by the "Porcupine" off Valentia, Ireland, in 113–180 f., and several specimens of *S. carocollatum* Lamk. on the Channel slopes in 257–539 f. (Jeffreys), while a living specimen of *S. pseudoperspectivum* Brocc. was dredged by the "Research" sixty miles off Cape Clear in 400 f. (Bourne).

Adeorbis subcarinatus Mont. — Scilly Islands (Smart and others): Jersey (Duprey and J.T.M.); Aberdovey; Mayo, Sligo, and Bundoran; Oban, Iona, and N. Rona.

Var. **interrupta** Marsh. n.var.—Shell more depressed and quoit-shaped, with three carinations instead of six—one underneath, one at the base, and one surrounding the suture of the penultimate whorl. Sometimes there is a fourth ridge round the periphery. Found in the Channel and Scilly Islands with the type, and probably in other places, but rare.

I first discovered this species alive in 1868, at Herm Island, and sent a specimen to Gwyn Jeffreys, who made a note of it ('Brit. Conch.', vol. 5, p. 216); two years afterwards, in the same island, I was fortunate in discovering its habitat, with plenty of specimens, adhering under large stones which are firmly and sometimes deeply embedded in muddy sand, at low water of ordinary tides. My written notes of the animal, accompanied by a rough sketch, agree with the descrip-

(To be continued).

tion of Mr. Duprey,¹ whose specimens were found in a similar habitat at Jersey, and they are not uncommon in all the islands if properly searched for. The only other locality in which I have taken living specimens is in Torbay, at extreme low water; but here they are very much eroded and ferruginous, very little of the sculpture remaining. Professor Gwatkin informs me that the radula is Rissoan.

This is another species in which the type-form has been confused by authors. Montagu's original description indicated six spiral ridges for his type, two of which encircle the umbilicus, one is at the base, two round the periphery, and a sixth encircles the suture of the next whorl. Jeffreys follows this description, and figures the shell correctly; Searles Wood, in describing the Crag form, notices the four upper ridges, but omits the two lower, though his figures show the six correctly; while Forbes and Hanley, copied by Sowerby, delineate a shell in which one of the ridges round the periphery is absent, as sometimes occurs in the var. *interrupta*, but they give the two typical ridges underneath. The authors of British Mollusca state that "four strong spiral ridges adorn the body-whorl, two above and two below,"² which they make up by omitting one from the periphery, and they do not notice the one which surrounds the suture of the penultimate, though S. Wood distinctly says "our shell has four distinct ridges, three on upper part of the whorl, and one upon the centre of the base."³ The figures in Sowerby's Index and British Mollusca also err in ignoring the very characteristic aperture of the type, which is correspondingly altered in the var. *interrupta* by the fewer number of ridges. *A. supranitida* S. Wood is another member of the genus which varies in having one, two, and sometimes three sharp ridges.

A. imperspicuus Monts. (*Journ. Malac.*, vol. 4, pp. 56-7, 1895; and *J. Conch.*, vol. 7, pp. 249-50, 1893, as *Cyclostrema millepunctatum*).—Off Southport, 12 f. (J. T. M.); Plymouth, Isle of Man, Connemara, and Oban (Chaster); S.W. Ireland, 40 f., (R. I. A. cruise, 1885). Also Sicily (Monterosato), and Tangiers (Chaster).

Var. **unisulcatus** Chast. (*J. Conch.*, vol. 8, p. 373, 1897).—Found occasionally with the type.

This minute species I first dredged off Southport in 1885, a single specimen only, not quite perfect, and put it aside for a time; but I have never found it in "drift from the Southport shore," as recorded by Dr. Chaster.

Note on a colour variety of *Cypræa argus*.—I have lately acquired a specimen of *C. argus* distinctly suffused with pale green colour. It is comparable to *C. arabica* var. *eglantina*. As far as I am able to ascertain this form has not been previously noted.—L. ST. G. BYNE (*Read before the Society*, May 14, 1902).

¹ *Ann. and Mag. Nat. Hist.* (4) vol. 18, p. 343, 1876.

² "Brit. Moll.," vol. 2, p. 541, pl. 68, f. 6-8.

³ "Crag Moll.," vol. 1, p. 139, pl. 15, f. 8a-8b.

SOUTH AFRICAN NOTES.

By E. W. SWANTON.

(Read before the Society, April 9, 1902).

Abundance of *Helix pisana*.—During a recent visit to Cape Town with Professor Jonathan Hutchinson, F.R.S., I observed *Xerophila pisana* in enormous numbers on an enclosed piece of ground about fifty yards from the coast at Sea Point, a suburb of Cape Town. Every blade of the scanty herbage, the under surface of every stone, the iron supports to the wire fencing, and even the greater part of a high stone wall which bounded the enclosure on one side were covered with these snails. On many sticks and twigs they were crowded like grapes in a large cluster. The weather was extremely hot, and they were all quiescent. I regret that I had no opportunity of seeing them in activity after a storm. Is *Helix pisana* an alien at the Cape? This was the only spot where I observed them on the mainland. Some fear was expressed by residents that they might extend their range, and ultimately invade the Public Gardens. The destruction caused by them when present in great numbers is very considerable. On visiting Robben Island—the great leper prison in Table Bay—I there found them in almost equal abundance, in fact, the interior of the island simply swarmed with them. I was told that their introduction dated from a few years ago, when it was premised that some had gained the island on wreckage from Sea Point, seven miles distant, where they were at that time frequent. The officials on the island were much perplexed as to how to cope with the ‘plague of snails’ which were rapidly destroying all the herbage. It was suggested that the introduction of a few ostriches—preferably females and young birds, adult males being dangerous during the breeding season, would soon bring about the desired effect, for these birds are voraciously fond of small molluscs. The type and varieties *lineolata* Moq. and *albida* Moq. occurred, the last was, perhaps, the more abundantly represented. *Phasis scapensis* also occurs here. The beach of this dreary island—the home of lepers, convicts, and lunatics—is rocky, surf-bound, and strewn with much seaweed. Amongst the boulders *Patella compressa*, *P. rustica* and *Oxytele merula* occur in some numbers, but none with the living animal.

Durban Bay.—On the sandy shore of Durban Bay I found *Bullia rhodostoma* Gray and *B. natalensis* Krauss. The latter was the more abundant; it was very interesting to note the facility with which it burrowed into the sand and hid itself from view upon being left behind by a retreating wave. A species of *Ianthina* and *Spirula peroni* were

common shells on the shore at the Bluff, the former with, the latter always without, the animal. Amongst some rocks here I took *Sistrum granulatum*, *Patella rustica*, *Natica plexa* and *Turbo coronatus*.

Durban Museum.—The Durban Museum consists of one room only, situated in the Town Hall Buildings. It is greatly overcrowded and none of the exhibits are shewn to advantage. It is proposed to build a new museum at an early date. The local collection of shells has been greatly enriched by the indefatigable researches of the Conservator, Mr. Quekett, who has succeeded in finding several species in the Bay, which had hitherto been recorded only from the Indian coasts. Perhaps the most interesting of these is *Xenophorus corrugatus*. Mr. Quekett very kindly gave me a fine example from this locality. Amongst many other exhibits from the Bay I noted:—

Clanculus kraussi, found by Quekett.

Umbrella indica " "

Harpa ventricosa

Terebra dimidiata

Fissurella natalensis

F. hiantula

Solarium maximum

Nassa arcularia

Ostrea prismatica

O. cucullata

Ostrea rufa

Cardium lima

Lima hians

Arca nivea

Chama gryphoides

Cytherea (Tivela) dolabella

Dosinia hepatica

Donax exaratus, found by Quekett.

D. lubrica

The collection also contains some beautiful examples of the shell of *Argonauta argo* from the Umhloti River, Natal.

The Maritzburg Museum.—This Museum is also much overcrowded. It consists of a single room adjoining the Public Reading Room. Here also the authorities are about to build a new Museum, and at a considerable expenditure. The conchological collection has been arranged by Mr. Burnup, the well-known collector, who has given many valuable specimens to it. The shells are mounted on cardboard which is fastened by tacks to the bottom of the cabinet, and as the drawers are always kept locked (except when application is made to the curator by an enthusiast) local people may be pardoned if they do not evince any interest in conchological matters. Nearly all the species which have been found at Durban find a place here. There are fine examples of *Conus imperialis* and *C. textile* from the Umtamvuna Beach. Amongst the terrestrial species are *Cyclostoma ligatum* from the Tugela Valley, and *C. insulare* from Malvern. *Achatina burnupi*, a fine olive-brown shell from the Drakensberg Mountains, with its almost spherical eggs, of the size of a large pea. From the same locality comes *Aerope caffra*. *Livinhacia kraussi* from Umkomaas and Durban. *Achatina granulata* is frequent in the Maritzburg district. I found it at Howick.

ON THE ADOPTION OF ROVERETO'S CYPRINIADAE FOR ARCTICA OF SCHUMACHER.

By R. BULLEN NEWTON.

(Read before the Society, May 14, 1902).

IN an attempt to revise the generic nomenclature of shells some years since, based on the observance of the "Law of Priority," I directed attention to the fact that Lamarck's *Cyprina* of 1818 was not retainable as a conchological name since Schumacher in the previous year had founded the genus *Arctica* for precisely the same mollusc. A further objection to *Cyprina* was also referred to, viz.:—its prior employment by Linnæus for a genus of fish. This revision in favour of *Arctica* was well received and has been very generally adopted by most leading writers on systematic mollusca. Now, however, we find that Schumacher's name must be relegated to synonymy on account of its pre-occupation as an Avian genus, by Moehring. For this information we are indebted to Professor Rovereto,¹ who, some two years ago, founded the entirely new name of *Cypriniadea* to replace the *Arctica* of Schumacher. Moehring's previous use of *Arctica* has also been very recently alluded to in the "Report of the Committee appointed to draw up a revised List of British Marine Mollusca and Brachiopoda" (*Journal of Conchology*, 1902, vol. 10, no. 6, p. 181). In this report the Committee, evidently without a knowledge of Rovereto's work, recommended *Cyprina* for adoption, an arrangement which seems to be opposed to the rules of zoological nomenclature. We gladly welcome, therefore, the new generic name of *Cypriniadea* for *Venus islandica* and its allies.

This result may be more clearly expressed as follows:—

GENUS **CYPRINIADAE**, G. Rovereto, 1900.

Illustr. Moll. Tongriani, *Atti R. Univ. Genova*, 1900, vol. 15, p. 96.

[Type=*Venus islandica* Gmelin].

Cyprina, Lamarck, 1812.

Extrait Cours Zool., 1812, p. 107 (=list name only).

non Linnæus, 1758 (*Syst. Naturæ*, 1758, Ed. X., p. 320).

Arctica, Schumacher, 1817.

Essai nouv. Syst. Hab. Test., 1817, p. 145.

non Moehring, 1758 (*Avium Genera*, 1752, p. 65; and in *Geslachten Vogelen*, 1758, pp. 5, 53).

Cyprina, Lamarck, 1818.

Hist. Nat. Anim. sans vert., 1818, vol. 5, p. 556.

Arctica, R. Bullen Newton, 1891.

Systematic List F. E. Edwards' Coll. Brit. Oligocene and Eocene Moll.,
British Museum, 1891, pp. ix and 295.

¹ An excellent resume of this work is given by M. Maurice Cossmann in his "Revue Critique Paléozoologie," 1900, p. 167.

BRITISH CEPHALOPODA: THEIR NOMENCLATURE AND IDENTIFICATION.

By WILLIAM E. HOYLE.

(Read before the Society, April, 9th, 1902).

THE revised list of British marine mollusca, drawn up under the auspices of this Society, has now been published, and has been authorised by the Society at its last annual meeting. As the responsibility for the names adopted for the Cephalopoda has rested mostly upon myself, I think it may be worth while to offer a brief explanation of the cases in which the nomenclature adopted by Jeffreys ['69], has been departed from. This is the more necessary as but few of our members have leisure to devote to studying mere questions of priority, and the history of some of the names in the present list is rather involved.

Jeffreys' list contained only fourteen species, whereas the one just published by the Society, includes twenty-one. Seven names used by Jeffreys do not now appear, whilst seven species have been added. Referring for a moment to the latest revision by the Rev. Canon Norman ['90], we find the present list is practically the same as his, with the exception of two or three changes of name. The differences between the three lists may best be shown by placing them side by side.

COMPARATIVE LISTS OF BRITISH CEPHALOPODA.

| CONCHOLOGICAL SOCIETY, 1902. | NORMAN, 1890. | JEFFREYS, 1869. |
|------------------------------------|--|-------------------------|
| <i>Onimastrephe sagittatus</i> ... | <i>O. (Todarodes) sagittatus</i> ... | <i>O. todarus</i> |
| <i>Sthenoteuthis pteropus</i> ... | | |
| <i>Illex coindetii</i> ... | <i>O. (Illex) coindetii</i> ... | } <i>O. sagittatus</i> |
| <i>Todaropsis eblanæ</i> ... | <i>O. eblanæ</i> ... | |
| <i>Architeuthis [monachus]</i> ... | <i>A. monachus</i> ... | |
| <i>Spirula peronii</i> ... | <i>S. peronii</i> ... | <i>S. peronii</i> |
| <i>Onychoteuthis [banksi]</i> ... | <i>O. banksii</i> ... | <i>O. banksii</i> |
| <i>Loligo forbesi</i> ... | <i>L. forbesii</i> ... | <i>L. vulgaris</i> |
| <i>L. media</i> ... | <i>L. media</i> ... | } <i>L. media</i> |
| <i>L. marmoræ</i> ... | <i>L. marmoræ</i> ... | |
| <i>Sepia officinalis</i> ... | <i>S. officinalis</i> ... | <i>S. officinalis</i> |
| <i>S. orbignyana</i> ... | <i>S. elegans</i> .. | <i>S. elegans</i> |
| <i>S. elegans</i> ... | <i>S. rupellaria</i> ... | <i>S. biserialis</i> |
| <i>Sepioida scandica</i> ... | <i>S. scandica</i> ... | } <i>S. rondeletii</i> |
| <i>S. atlantica</i> ... | <i>S. atlantica</i> ... | |
| <i>Rossia macrosoma</i> ... | <i>R. macrosoma</i> ... | <i>R. macrosoma</i> |
| <i>R. glaucopsis</i> ... | { <i>R. glaucopsis</i> ... <i>R. sublevis</i> ... | } <i>R. papillifera</i> |
| <i>Taonius hyperboreus</i> ... | <i>T. hyperboreus</i> ... | |
| <i>Polyopus vulgaris</i> ... | <i>Octopus vulgaris</i> .. | <i>O. vulgaris</i> |
| <i>P. arcticus</i> ... | <i>O. arcticus</i> ... | |
| <i>Moschites cirrosa</i> ... | <i>Eledone cirrosa</i> ... | <i>E. cirrosa</i> |

Ommastrephes sagittatus.—The question of the right name to be adopted for this species has given rise to a prolonged controversy,

and I am the more anxious to make the explanation which follows because in an earlier work ['86, p. 34] I adopted a view which I now feel to have been erroneous. First, as regards the specific name, which is taken from Lamarck [1799, p. 13]. His *Loligo sagittata* is stated to exist in two varieties, of which the first (called "a") must naturally be regarded as typical. The description certainly agrees better with the form under consideration than with any other, notably in regard to its dimensions and the length of the tentacles, but the identification is rendered certain by the reference to two figures in the great work of Seba [1761, vol. 3, pl. 4, figs. 1, 2], the suckers extending nearly the whole length of the tentacles, being quite diagnostic. Thirty years later the great Italian anatomist, delle Chiaje ['29, vol. 4, p. 161, pl. 60] gave the same form the name *L. todarus*, which was adopted by d'Orbigny, and after him by Jeffreys. D'Orbigny still further confused the matter by affixing Lamarck's name (*sagittata*) to a quite different form, as we shall see later.

Next, as to the generic name under which this species ought to be ranged: The genus *Loligo* was first dismembered by d'Orbigny ['35, p. 45], and the form under consideration, along with several others, placed in the newly-created genus *Ommastrephes*. Subsequently this genus was in its turn broken up by Verrill ['80a, p. 223] and by Steenstrup ['80]. Verrill erected a genus, *Sthenoteuthis*, which included one of d'Orbigny's original species (*O. bartramii*) and two others (*O. megaptera* and *O. pteropus*); he therefore left the *L. sagittata* of Lamarck in the restricted genus *Ommastrephes*. Steenstrup, on the other hand, created the genus *Todarodes* for our present species, and left *O. bartramii* in the restricted genus *Ommastrephes*. In deciding which of these two courses is to be followed, we must refer to the rules drawn up for zoological nomenclature. The first of those which apply in the present instance is that if the author of a genus has indicated a particular species as its type, that species must remain in the genus if at any future time other generic groups are separated from it. The second is that in cases where this rule cannot be applied, the opinion of the author who first divides a genus is to be adopted. We have, therefore, to enquire in the first instance did d'Orbigny clearly indicate any particular species as the type of his genus *Ommastrephes*? D'Orbigny's own words ['35, p. 47] are as follows:—"Parmis les espèces connues jusqu'à présent, ou peut compter le *Loligo sagittata* Lam., dont les bras pédonculés soient couverts de ventouses sur toute leur longueur; le *L. Oualaniensis* Less.; le *L. brongniartii* Blainv.; le *L. piscatorum* Lapil.; le *L. bartramii* Les.; le *L. illecebrosa* Les.; le *L. Vanicoriensis* Quoy et Gaim., et probablement le *L. pelagicus* Bosc." It is true that he does not specifically mention a type, but in default of other evidence it would be natural to suppose that he regarded the

species first mentioned—the only one of which he gives any descriptive notice—as typical.

Steenstrup ['80, p. 75] maintained that *O. bartramii* and the allied pelagic forms of the high seas were those upon which the genus was founded; this seems to me, however, to be an inference based upon the fact that the creation of this genus was the result of his studies of pelagic life during the voyage to and from South America, rather than upon any documentary evidence. The only evidence of this latter kind adduced by Steenstrup ['81, p. 4, footnote] is the fact that Herrmannsen ['47, p. 145] mentions *O. bartramii* as the type of the genus *Ommastrephes*. I greatly regret that I did not question Prof. Steenstrup on the matter when I had the pleasure and profit of working with him, but I did not at that time realise its importance. We may, I think, conclude that on this ground alone there is a presumption in favour of *Ommastrephes sagittatus* (Lamarck) (= *O. todarus* d'Orb.) being the typical species of *Ommastrephes*.

Leaving this as an open question, however, we may enquire who first dismembered the genus and what view did he adopt? Verrill and Steenstrup both published their views in the year 1880. Steenstrup's paper was read before the Kongelige Danske Videnskabernes Selskab on April 2nd and published on July 10th; Prof. Verrill's definition appears to have been printed in the *Transactions of the Connecticut Academy* in February, 1880, published in March, and at all events appeared in the *American Journal of Arts and Science* in April, 1880, so that unquestionably his procedure takes precedence of that of Steenstrup. We see then that whether we consider the type of d'Orbigny's genus (so far as it can be ascertained) or the rights of priority we are led to the same conclusion—that the genus *Ommastrephes*, whatever else it may or may not include, must contain the *Loligo sagittata* of Lamarck (= *O. todarus* of d'Orbigny and of Jeffreys). This view has already been advocated by Girard ['90, p. 36] and Pfeffer [:00, p. 379].

The generic name *Ommastrephes* was altered by Lovén ['46] and Agassiz ['48, p. 475] to *Ommatostrephes*, and this spelling has been adopted by some subsequent writers besides Jeffreys. The rule of the International Zoological Congress provides that "the original orthography of a name is to be preserved unless an error of transcription, a *lapsus calami*, or a typographical error is evident," hence it is, I think, necessary to adhere to the original form.

Sthenoteuthis pteropus.—The occurrence of this large squid in British waters is recorded by Goodrich ['92], who also gives figures of a good many structural details.

Illex coindetii.—This species is the one for which d'Orbigny [Fér. & d'Orb., '35, p. 345] adopted the name *sagittata*. Why he did so is not clear, for according to his own showing the "var. A." of

Lamarck, which is given first and must therefore be regarded as the typical form of the species, is the one to which he has attached delle Chiaje's name *todarus*. The name *sagittata* being therefore invalid for this form, the earliest available is *coindeti* given to it by Vérany ['39, p. 94] in honour of Dr. Coindet, of Geneva. The genus *Illex* was created, with this species as its type, by Steenstrup ['80, p. 90] for those forms which have the funnel groove without folds and the tentacles without connecting apparatus.

Todaropsis eblanæ.—The species was described by Ball ['41, p. 363] as a *Loligo*, and was regarded by Jeffreys as one of the sexes of his *Ommastrephes sagittata* (= *I. coindeti*). The genus *Todaropsis* was established by Girard ['90, p. 204] for a new species *T. veranyi*, from the Portuguese coast. At present the genus includes only these two species, and I do not feel at all sure that they may not be identical.

Architeuthus.—Norman ['90, p. 478] has collected the recorded occurrences of specimens of this genus, but the specific identifications are involved in some uncertainty. The name is very commonly misspelt *Architeuthis*; Steenstrup ['81, p. 1, footnote] explains that it is derived from *τενθός*, used by Aristotle for a larger and stronger kind of squid than *τενθίς*, and therefore the form adopted by him must be maintained.

Loligo forbesi.—This is the ordinary British *Loligo*, which Jeffreys did not distinguish from the Mediterranean *L. vulgaris*. The points of distinction have been given by myself ['85, p. 459] and by Norman ['90, p. 480]. It is quite possible that *L. vulgaris* does occur on our southern coasts, and a careful watch for it should be kept by marine zoologists in that region.

Loligo marmoræ was regarded by Jeffreys as a variety of *L. media*. It is, however, a good species. The distinctive characters are given by Norman ['90, p. 482].

Sepia orbignyana.—A great amount of confusion has arisen between this species and the next, in consequence of the name *elegans* having been applied by different writers to two quite distinct forms. The species now under consideration was named by Férussac in 1826 [d'Orbigny, '26, p. 66]; the name *S. elegans* de Blainville was adopted for it by Vérany ['51, p. 70] in his beautifully illustrated monograph, and after him by Jeffreys, who, however, correctly states that it is the same as *S. orbignyana* Férussac.

Sepia elegans.—This species was first created by d'Orbigny in 1826, in the legend of one of the plates of his "Céphalopodes acetalifères" [Fér. & d'Orb., '35, pl. 8, figs. 1-5], and subsequently further defined in the text of the same work in 1848 (p. 280).

On consideration of the evidence, I am inclined to agree with Dr. Jatta [’96, p. 160] that *S. ruppellaria* must be regarded as a synonym of this. The latter name was founded only on a shell, which is certainly extremely like that of *S. elegans*. There is a confusion regarding this species in Dr. Norman’s “Revision” [’90, p. 484]; the first reference is correctly to d’Orbigny’s *Sepia elegans*, which Norman calls *S. ruppellaria*, but the citation from Jeffreys [’69, p. 140] refers to *S. elegans* of de Blainville, as understood by Vérany, which, as above shown, is a synonym of *S. orbignyana* Férussac.

The name *S. biserialis* of Montfort, adopted by Jeffreys, seems to have been merely a MS. name until adopted by Vérany [’51, p. 73], hence the name given by d’Orbigny [Fér. & d’Orb., ’35, pl. 8, figs. 1–5], in 1826, takes precedence.

***Sepiola scandica*.**—This is the form commonly referred to by British naturalists as *S. rondeleti*. It is distinguished by possessing a simple pyriform ink-sac, whereas that of the Mediterranean species is trilobed or eared.

***Sepiola atlantica*.**—Jeffreys’ remark [’69, p. 137] that this is the male of *S. rondeleti* can only have arisen from a complete misconception of the points of sexual dimorphism in the Cephalopoda.

***Rossia glaucopsis*.**—I have elsewhere [’86, p. 117] given the reasons for regarding Jeffreys’ *R. papillifera* as a synonym of this: the identification rests on a comparison of Jeffreys’ type with authentically named Scandinavian examples. I entertain no doubt that *R. sublevis* Verrill is a synonym of this species. Norman only included it in his list with great misgiving.

***Polypus*
*Moschites*** } I have elsewhere [’:01] shown reason for using these names in place of the well-known *Octopus* and *Eledone*. They were proposed and accurately defined by Schneider so long ago as 1784, and have most unaccountably escaped notice.

KEY FOR THE DETERMINATION OF BRITISH CEPHALOPODA.

The accompanying key will, it is thought, serve for the identification of all British Cephalopoda; so far as practicable the characters are such as can be made out either from external inspection alone, or with a minimum of dissection, and no characters have been used which are dependent on sex. In the genus *Sepiola*, for example, it is necessary to cut open the mantle just to one side of the ventral median line; the ink-sac will then generally be visible through the tissues, if not the integument must be carefully removed until its outline can be made out. The distinctive characters of a few forms not yet certainly recorded as British have been added.

In case of difficulty I shall at any time be glad to help my colleagues by examining Cephalopods from known British localities, if they will send them to me.

| | | | | |
|----|---|---|-----------------------------|----|
| 1 | { | A spiral chambered shell - - - | <i>Spirula peroni</i> | |
| | | No spiral chambered shell - - - | - | 2 |
| 2 | { | Ten arms and a fin - - - | - | 3 |
| | | Eight arms and no fin - - - | - | 23 |
| 3 | { | Some of the suckers in the tentacular club provided with hooks - - | <i>Onychoteuthis banksi</i> | |
| | | None of the suckers provided with hooks - - | - | 4 |
| 4 | { | Fin extending the whole length of the mantle, a hard internal dorsal shell (<i>Sepia</i>) - - | - | 5 |
| | | Fin confined either to the end or to the middle of the sides of the mantle - - | - | 7 |
| 5 | { | Suckers on the sessile arms in two rows, ¹ shell with no posterior spine - - | <i>Sepia elegans</i> | |
| | | Suckers on the sessile arms in four rows; shell with a more or less prominent posterior spine - | - | 6 |
| 6 | { | Breadth of mantle more than half the length (56 per cent.); spine not very prominent - | <i>Sepia officinalis</i> | |
| | | Breadth of mantle less than half the length (43 per cent.); spine very prominent | <i>Sepia orbignyana</i> | |
| 7 | { | Fins elliptical on either side of the middle of the mantle - - - | - | 8 |
| | | Fins beginning close to the hinder extremity of the body and extending forwards a variable distance along each side of the mantle - | - | 12 |
| 8 | { | Mantle fold continuous across the nuchal region (<i>Rossia</i>) - - - | - | 9 |
| | | Dorsal surface continuous with that of the head in the middle line (<i>Sepiolo</i>) - - | - | 10 |
| 9 | { | Back smooth - - - | <i>Rossia macrosoma</i> | |
| | | Back papillate - - - | <i>Rossia glaucopsis</i> | |
| 10 | { | Suckers in two rows on all the sessile arms - | - | 11 |
| | | Suckers in two rows except at the tip of the ventral arms, where there are about four rows of very minute suckers; ink-sac tri-lobed or eared - - | <i>Sepiolo atlantica</i> | |
| 11 | { | Ink-sac tri-lobed or eared - - | <i>Sepiolo rondeleti</i> | |
| | | Ink-sac pyriform - - - | <i>Sepiolo scandica</i> | |

¹ In the middle portion of one or two arms there is often a tendency for the suckers to form four rows, especially if the specimen is much contracted.

- | | | | |
|----|---|---|----|
| 12 | { | Mantle united with the funnel on either side at its base - - - - - <i>Tuonius hyperboreus</i> ¹ | |
| | | Mantle forming a cartilaginous articulation with the base of the siphon on either side - - - - - 13 | |
| 13 | { | The integument of the head passing continuously over the eyes (<i>Loligo</i>) - - - - - 14 | |
| | | The eye lying open in a cavity with free eye-lids - - - - - 17 | |
| 14 | { | Hinder extremity rounded; fin more than half the length of the mantle; size of adult more than 150 mm. in length of mantle - - - - - 15 | |
| | | Hinder extremity pointed; fin not exceeding half the length of the mantle, which does not exceed 150 mm. ² - - - - - 16 | |
| 15 | { | Four subequal rows of suckers on the tentacles; chromatophores united into elongated patches on the anterior part of the ventral surface of the mantle - - - - - <i>Loligo forbesi</i> | |
| | | Two rows of large central and two rows of small lateral suckers on the tentacle; chromatophores evenly distributed - - - - - <i>Loligo vulgaris</i> | |
| 16 | { | Mantle terminating posteriorly in a conical apex; suckers of sessile arms with smooth horny ring; large tentacular suckers with square teeth - - - - - <i>Loligo marmoræ</i> | |
| | | Mantle terminating posteriorly in a longer or shorter cylindrical process; suckers of sessile arms with a toothed horny ring; suckers of tentacles with a smooth ring - - - - - <i>Loligo media</i> | |
| 17 | { | Mantle connective consisting of a long ridge on either side fitting into a trough-like groove on either side of the base of the funnel - - - - - 18 | |
| | | Mantle connective in the shape of an inverted \perp fitting into a similarly shaped cartilage at the base of the funnel (<i>Ommastrephidae</i>) - - - - - 19 | |
| 18 | { | Size large, exceeding 1.5 metre in length of mantle - - - - - <i>Architeuthis</i> | |
| | | Size small or moderate, not exceeding 50 mm. in length of mantle - - - - - <i>Tracheloteuthis</i> ³ | |
| 19 | { | Arms of the third pair with a broad membranous expansion, crossed by parallel ribs; funnel groove with folds - - - - - (<i>Sthenoteuthis</i>) | 20 |

¹ Other members of the family Cranchiidae would also come in here.

² In some specimens of *Loligo media* with very elongated caudal extremity, the length of the fin may exceed half that of the mantle.

³ A species of this genus (*T. riisei* Stp.) has been recorded from a locality only a few miles north of the British area as here defined, so that it may reasonably be expected to occur within that area; for further details see Hoyle, '36, p. 163, Fowler, '97, p. 525, Steenstrup, '98.

- 19 { Arms of the third pair with only a narrow marginal expansion; length of mantle rarely exceeding 0.25 m. - - - - 21
- 20 { Size large, when full grown about 1 m. in length; connecting apparatus of four or five suckers or pads reaching some distance down the stem from the club of the tentacles *Sthenoteuthis pteropus*
Size smaller, length rarely exceeding 0.3 m.; connecting apparatus of three suckers and pads close to the root of the tentacular club *Sthenoteuthis bartrami*
- 21 { Tentacular suckers extending down the stem almost to the roots; funnel groove with folds. *Ommastrephes sagittatus*
Tentacular suckers confined to the club; funnel groove smooth - - - - 22
- 22 { Horny ring of tentacular suckers smooth; of sessile arms with six conical teeth on the distal semi-circumference - - - *Illex coindetii*
Horny ring of tentacular suckers and of those of the sessile arms toothed like a saw *Todaropsis eblanæ*
- 23 { Suckers in two rows (*Polypus*) - - - 24
Suckers in a single row - - - *Moschites cirrosa*
- 24 { Littoral; size up to two feet or more in total length; length of arms about four times that of mantle - - - *Polypus vulgaris*
Deep-sea; size not exceeding six inches; length of arms about three times that of mantle *Polypus arcticus*

BIBLIOGRAPHY.

- AGASSIZ, L. [48]. Nomenclator zoologicus, Index universalis. Soloduri, 1848.
- BALL, R. [41]. On a species of *Loligo* found on the shore of Dublin Bay. *Proc. R. Irish Acad.*, vol. 1, p. 362-364, figs. 1-7, 1841.
- DELLE CHIAJE S. [29]. Memorie sulla storia e notomia degli animali senza vertebre del regno di Napoli, vol. 4. Napoli, 1829.
- FÉRUSAC & D'ORBIGNY. [35]. Histoire naturelle générale et particulière des Céphalopodes acétabulifères, vivants et fossiles. Paris, 1835-48.
- FOWLER, G. H. [97]. Contributions to our knowledge of the Plankton of the Færø Channel. *Proc. Zool. Soc.*, 1897, p. 523-526.
- GIRARD, A. [90]. Nota sobre os cephalopodes de Portugal. *Jorn. sci. Lisboa* (2), no. 3, p. 200-205, 1889 [1890].

- GOODRICH, E. S. ['92]. Note on a large Squid (*Ommastrephes pteropus* Stp.). *Journ. Mar. Biol. Assoc.*, n.s., vol. 2, p. 314-321 1892.
- HERRMANNSEN, A. N. ['47.] *Indicis generum malacozoorum primordia*. Casselis, 1847-49.
- HOYLE, W. E. ['85]. Note on *Loligo forbesii* Steenstrup, the so-called *L. vulgaris* of our coasts. *Proc. Roy. Phys. Soc. Edin.*, vol. 8, p. 459-462, 1885.
- ['86]. Report on the Cephalopoda collected by H.M.S. Challenger during the years 1873-76. *Challenger Reports*, vol. 16, part 44. London, 1886.
- [:01]. On the generic names *Octopus*, *Eledone*, and *Histiopsis*. *Mem. Manchester Lit. and Phil. Soc.*, vol. 45, no. 9, 7 pp., 1901.
- JATTA, G. ['96]. I cefalopodi viventi nel Golfo di Napoli, Fauna u. flora des Golfes von Neapel, part 23. Berlin, 1896.
- JEFFREYS, J. G. ['69]. British Conchology, vol. 5, p. 121-147. London, 1869.
- LAMARCK, J.B.P.A. de ['1799]. Sur les genres de la Sèche, du Calmar et du Poulpe. *Mém. Soc. hist. nat. Paris*, vol. 1, An 7, p. 1-25, pl. 1, 2, 1799.
- LOVÉN, S. ['46]. Index molluscorum litora Scandinaviæ occidentalia habitantium. *Öfversigt K. Svensk. Vet. Akad. Förh.*, 1846, p. 135-163, 1846.
- NORMAN, A. M. ['90]. Revision of British Mollusca. *Ann. Mag. Nat. Hist.* (6), vol. 5, p. 457-484, 1890.
- D'ORBIGNY, A. D. ['26]. Tableau méthodique de la classe des céphalopodes. *Ann. Sci. Nat.*, vol. 7, 1826.
- ['35]. Voyage dans l'Amérique méridionale . . . exécuté dans le cours de années, 1826-33; vol. 5, Mollusques, Paris, 1835-46.
- PFEFFER, G. [:00]. Synopsis der oegopsiden Cephalopoden. 2 *Beiheft z. Jahrb. Hamburg Wiss. Anstalten* 17, p. 147-198, 1900.
- SCHNEIDER, J. G. ['1784]. Charakteristik des ganzen Geschlechts und der eizelnen Arten von Blakfischen. *Samml. vermisch. Abhandl. z. Aufklärung d. Zool.*, p. 105-134. Berlin, 1784.
- SEBA, ALB. ['1761]. Locupletissimi rerum naturalium thesauri . . . accurata descriptio, etc., vol. 3. Amstelodami, 1761.
- STEENSTRUP, J. J. S. ['80]. De Ommatostrephagtige Blæksprutters indbyrdes Forhold. *Oversigt K. Dansk. Vid. Selsk. Forh.*, 1880, p. 71-110, pl. 3, 1880.
- , ['81]. Professor A. E. Verrill's to nye Cephalopod-slægter: *Sthenoteuthis* og *Lestoteuthis*. *Op. cit.*, 1881, 27, p. 8, pl. 1, 1881.

STEENSTRUP, J. J. S. ['98]. Notæ Teuthologicæ, 9 [*Tracheloteuthis*].
Op. cit. 1898, no. 2, p. 111-118, pl. 1.

VERANY, J. B. ['39]. Mémoire sur six nouvelles espèces de céphalopodes trouvées dans la Méditerranée à Nice. *Mem. Accad. Torino*, vol. 1, p. 91-98, pl. 1-6, 1839.

—— ['51]. Mollusques méditerranéens observés, décrits, figurés et chromolithographiés d'après le vivant, pt. 1, Céphalopodes de la Méditerranée. Gênes, 1851.

VERRILL, A. E. ['80]. Synopsis of the Cephalopoda of the North-Eastern Coast of America. Brief Contributions to Zoology from the Museum of Yale College. No. xlv. *Amer. Journ. Sci.*, vol. 19, p. 284-295, pl. 12-16, April, 1880.

—— ['80a]. The Cephalopods of the North-Eastern Coast of America. *Trans. Conn. Acad.*, vol. 5, p. 177-446, pl. 26-56, 1880.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Nautilus, vol. 15, no. 12, April, 1902, and vol. 16, no. 1, May, 1902.

"New Land Shells from the Santa Marta Mountains, Colombia," by H. A. PILSBRY and G. H. CLAPP [*Glandina callista*, *Circinaria ponsonbyi*, *Aperostoma sanctemarthæ*, *A. smithi*, *Helicina sanctemarthæ*, nn.spp.]. "Note on the Distribution of Species of the *Pleurodonte acuta* Group," by P. W. JARVIS [with map of Jamaica showing range of the different forms]. "Notices of New Land Shells of the Japanese Empire," by H. A. PILSBRY [*Mandarina hirasei*, *Hirasea goniobasis*, *Diplommatina dormitor*, nn.spp. ; *Hirasiella* n.g. for *H. clara* n.sp.]. "Note on *Serridens oblongus* Cpr.," by F. W. KELSEY [under mantle or clinging to shell of *Ischnochiton conspicuus*].

"Note on the Distribution of the *Pleurodonte sinuata* Group," by P. W. JARVIS [20 spp. with notes and illustrative map of Jamaica]. "Notices of New Land Shells of the Japanese Empire," by H. A. PILSBRY [*Punctum morseanum*, *Microcystina yakuensis*, *Kaliella okiana*, *K. hizenensis*, nn. spp. ; several nn. varr.]. "Description of a New *Unio* [*Quadrula beauchampii*, figd.] from Tennessee," by W. A. MARSH. "*Pholas truncata* in Salem Harbour," by E. S. MORSE. "A New *Rissoina* [*R. bakeri*] from California," by P. BARTSCH.

The Journal of Malacology, vol. 9, no. 1, April 10, 1902.

"A Classified List of the Helicoid Land Shells of Asia," by G. K. GUDE. "On the Anatomy of the Genus *Myotesta* Cllge.," by W. E. COLLINGE [made the type of a new family, Myotestidæ, with pl.]. "Description of a new species of *Onchidium* [*O. burnupfi*] from South Africa," by W. E. COLLINGE. "The Anatomy of the British species of the Genus *Solen*, pt. 3," by H. H. BLOOMER [nervous system, with pl. 2]. "Descriptions of six new Land Shells from the Malay Peninsula" by E. R. SYKES [*Rhodina* (?) *mirabilis*, *Streptaxis collingei*, *Opisthostoma laidlawi*, *Clausilia* (*Pseudonenia*) *kelantanese*, *Platyraphe chrysalis*, *Opisthoporus dautzenbergi*, nn spp.].

Journal de Conchyliologie, vol. 49, no. 4.

"Descriptions de coquilles nouvelles provenant de la Nouvelle-Calédonie," by PH. DAUTZENBERG [*Rhytida bernieri*, *Placostylus houaillensis*, nn.spp.]. "Descriptions de Cérithidés nouveaux," by L. VIGNAL [*C. dautzenbergi*, *C. barayi*, New

Caledonia. "Descriptions de coquilles nouvelles rapportées du Pérou par M. Baer," by PH. DAUTZENBERG [*Helix (Labyrinthus) baeri*, *Drymaeus jousseaumei*, *D. scoliodes*, *Bulinulus (Ataxus) huayabensis*, *Ampullaria baeri*, nn. spp.]. "Diagnoses de quelques coquilles nouvelles provenant du Maroc (*suite*)," by P. PALLARY [*Fusus crassus*, *Ocenebrina edwardsi* v. *apiculata*, *Mesalia pulchella*, *Gibbula tingitana*, nn.]. "Observations concernant les 'Considérations sur les faunes malacologiques des parties australes du globe,' par M. C. F. Ancey," by H. SUTER. "Rectification d'une erreur de détermination," by C. MAYER-EYMAR [*Natica nysti* Desh. (*nec* d'Orb) = *N. conomphalus* Sandberger]. "Variétés : Sur une nouvelle variété de *Chlamys opercularis*," by PH. DAUTZENBERG [var. *septenvillei*, from Croisic].

Proceedings of the Royal Society of Victoria, vol. 14, pt. 1, August, 1901.

"Growth Stages in Modern Trigonias, belonging to the Section Pectinatae," by T. S. HALL. "Contributions to the Palæontology of the older Tertiary of Victoria, Lamellibranchs, pt. 2," by G. B. PRITCHARD [several nn. spp. figured on pls. 2, 3]. "Some Sections illustrating the Geological Structure of the Country about Mornington," by T. S. HALL and T. B. PRITCHARD [with list of mollusca].

The Irish Naturalist, vol 11, no. 4, April, 1902.

"*Cardium norvegicum* at Portmarnock," by R. LL. PRAEGER.

The Annals of Scottish Natural History, no. 42, April, 1902.

"*Helix hortensis* and *Vertigo pygmaea* in West Lothian," by R. GODFREY.

La Feuille des Jeunes Naturalistes, sér. 4, ann. 32, nos. 378, 379, April, May, 1902.

"Note géologique : Faunule du Vésulien (Bathonien inférieur) de la côte d'Andelarre (Haute-Saone) (*fin*)," by P. PETITCLERC. "Les Mollusques de la Tarentaise," by G. COUTAGNE [49 spp. L.F.W. recorded].

The Naturalist, pts. 543 and 544, April and May, 1902.

"Drift shells from the River Ancholme, in Cadney Parish, Linc., N." [47 spp. recorded]. "North-west Lindsey Mollusca : South Kelsey Parish" [shells climbing]. "*Anodonta cygnea* in north-west Lindsey," by Rev. E. A. WOODRUFFE-PEACOCK. "Variation in *Helices* in the Grimsby district," by ARTHUR SMITH [four varr. of *H. nemoralis*].

"Marine Mollusca of Sandsend, Yorkshire," by Miss M. V. LEBOUR [list of 84 spp., with notes; *Doris johnstoni* possibly mimetic of *Halichondryia panicea*]. "Mollusca in Louth district," by C. S. CARTER [three *Helices*]. "*Limnaea peregrina* monst. *decollatum* at Rossington, south-west Yorkshire," by H. H. CORBETT. "*Ancylus fluviatilis* in Windermere Lake," by F. M. BURTON.

"**The Land and Freshwater Mollusca of Staffordshire**," by JNO. R. B. MASEFIELD. (*Trans. N. Staff. Field Club*, vol. 36, 1902). [General sketch and list of 98 spp.].

"**On the Genus *Acaus* Mont.**," by E. R. SYKES [notes on 7 spp.] (*Proc. Malac. Soc.*, vol. 4, part 3, 1900).

"**On *Despina cinnamomea*, n.sp.**" [Ecuador], by E. R. SYKES (*Tom cit*).

"**Notes on the Non-Marine Mollusca of Norfolk and Phillip Islands**, with Descriptions of New Species," by E. R. SYKES [8 nn.spp., figd., *Fretum* nn. for *Eurytus* Semper, preocc.] (*Tom. cit*).

"**Notes on the Genus *Temesa* H. & A. Ad.**, with Descriptions of two New Land Shells (*Temesa* and *Clausilia*), from South America," by E. R. SYKES [*Bulinus clausilioides* Rve. taken as type; *T. magnifica*, *Cl. pilsbryi* nn.spp.], (*Op. cit.*, part 5, July, 1901).

"**Mollusca and Brachiopoda**," by E. R. SYKES (*Zool. Record*, vol. 37, 1900)

THE SECTION *PLACOSTYLUS* OF THE GENUS *BULIMUS*.

By EDWARD COLLIER.

(Read before the Society, May 14, 1902).

As the shells of the section *Placostylus* are our principal exhibit to-night, I have been asked to give you some information about them, as some years ago I worked up this group, having received a fine series of these shells from the late Mr. E. L. Layard, of Budleigh Salterton, S. Devon, who was for some time British Consul in the Fiji Islands, and afterwards in New Caledonia.

Their head-quarters seem to be New Caledonia and the adjacent islands, but they are also found, though differing considerably in form, as far north as the Solomon Islands, as far east as the Fiji Islands, and in the south, two species are found in the North Island of New Zealand, one in Lord Howe Island, and one in Rabbit Island, a small rock close to Lord Howe Island.

In Pfeiffer's 'Monograph of *Bulimus*' only the following seven species of *Placostylus* are described and figured, viz. :—

1. *Placostylus fibratus* Martyn.
2. " *porphyrostomus* Pfr.
3. " *bovinus* Brug. (*shongii* Lesson).
4. " *fuliginus* Pfr.
5. " *salomonis* Pfr.
6. " *cleryi* Petit.
7. " *mittocheilus* Reeve.

But in Clessin's Edition, 1881, there are mentioned fifty-eight species of *Placostylus*, including ten species of subsection *Charis*. In Paetel's Edition, 1890, there are, including *Charis*, which he raises to a section by itself, seventy-five species and fifteen named varieties.

The last work consulted and considerably used in writing this paper is Martini and Chemnitz's "Conchylien-Cabinet" (1890-91), in which they describe and figure no less than eighty-six species and fifteen named varieties, although I believe they have omitted a few species. I leave you to judge after seeing the large series of shells exhibited to-night whether you do not think many of the so-called species are only different forms caused by locality and environment.

The shells of the section *Placostylus* are long conical shells, generally wholly without umbilicus, many very strong and heavy, mostly coarsely striated, or indented as if hammered, more seldom smooth and glossy. The number of whorls vary between $4\frac{1}{2}$ and 8, they increase regularly and are separated by an appressed, generally slightly raised suture, and mostly slightly notched. The upper whorls are mostly always

rubbed smooth, only in quite young specimens can be recognised a regular punctuation, as the remnant of a hairy covering rubbed away. The last whorl is large, frequently pressed together from the front towards the back as in *Auricula*. The spire is twisted and carries an oblique fold, which is often very strongly projecting. The mouth is a long oval, often irregular, and narrowed by folds and teeth. The rim of the mouth is more or less thickened, spread out, or slightly reflected. The two margins are united by a callus, which frequently carries on the middle a deep standing knob or tooth. The rim of the columella is broad and appressed. These large *Auricula*-like *Bulimi* form one of the most interesting groups, in the richness of their forms, of the whole genus.

Their geographical boundary is notably of the sharpest, at least if we take the series in my sense, that is to say, including *Charis*, *Aspastus* and *Eumecostylus*,—New Caledonia, the Fiji Islands, the Solomon Islands, and the south-eastern part of the New Hebrides. One or two out-lying species are found in the North Island of New Zealand, perhaps vestiges of a very old connection between the land, more probably carried about by travellers in very early times. This comprises the whole of the *Placostylus* district. Not only are these shells missing from the continent of Australia, and also in New Guinea, according to the present state of our knowledge, but also in the Bismarck Archipelago on the one side, and Tonga and Samoa on the other side, however much the fauna of these groups of islands may be related in other respects with those of the Fiji and Solomon Islands.

Within this district there prevail, the genuine *Placostyli*, with thick shells, living on the earth (*Euplacostylus* Crosse), in New Caledonia, and there attain their greatest development, whilst in the Fiji Islands are prevalent the thinner-shelled, tree-inhabiting *Charis*, but they do not include one another, because as a rule most groups are connected with each other through intermediate forms. Conchologically the boundary is an extremely sharp one with the next section of *Bulimus* (*Amphidromus*) which in *Bulimus janus* pushes forward a representative into the *Placostylus* district, this shell being found in the New Hebrides.

Placostylus has conchologically no relations with *Amphidromus*, although the soft parts, according to Semper's investigations, are very similar, on the other hand, some *Placostyli* approach considerably two South American groups, in form and habit, and that in two directions, both to the large *Borus* (various toothless *Placostyli*, such as *P. bavayi*) as also to the smaller *Bulimulidæ* of the section *Drymæus* (such as *pancheri* and *loyaltyensis*). An appearance, which under certain circumstances, could be employed in favour of the hypothesis of the whole of the Pacific Ocean, having once being taken up by a

continent, but the nearest affinity is evidently to that of the widely spread genus *Partula*, to whose longer forms many of the smaller *Placostyli* approach very closely.

The forms belonging to *Placostylus* are distributed by Albert and von Martens over three different subsections. *Placostylus* with the type *Bul. fibratus* Martyn, *Eumecostylus* with the type *Bul. cleryi* Petit, including as a subspecies (*Aspastus*) the beautiful *Bul. miltocheilus* Reeve, and *Charis* with the type *Bul. malleatus* Jay. The numerous recent discoveries have effaced the boundary between *Placostylus* and *Eumecostylus*. *Charis* is, however, divided from both not only by its thinner shell and the deviating markings, but more particularly by its mode of living. All kinds of *Charis* live on trees and shrubs, whilst the genuine *Placostyli* never leave the ground. *Bulimus miltocheilus*, which is also arboreal, still stands quite isolated, and must be yet maintained as a separate subspecies.

In New Caledonia the larger *Placostyli* formed, until the introduction of the European domestic animals, a very important source of food for the natives. They are still eaten up to the present time, and also French settlers have become familiarized to them as food.

The grouping of these *Placostyli* is much more difficult than any other section of *Bulimus*. The development of the tooth on the mouth-wall of the connection callus, and also of the mouth seam, and even of the columellar fold apparently depends on the age of the animal, the thickening continuing to go on, even in the mature shell, and may attain ultimately such a high degree that the columellar fold disappears, whilst on the other hand, some shells exist, which appear quite complete with feeble wall-callus and quite toothless. Under unfavorable circumstances, such as want of food, and especially want of lime, or in dry places, the thickening may remain trifling and thus we get in many species local varieties with thinner shells, feeble mouth seam and with a just noticeable tooth, or even without tooth.

But also the colouring is an extremely variable one, especially that of the mouth, and side by side there are forms with dark brown or brilliantly orange coloured gums and richly coloured mouths, along with many species with pale yellow gums and purely white mouth edges. Lastly the *Placostyli*, as all large snails, are exposed to many injuries and therefore inclined to the development of individual abnormalities, which form sometimes a quite differing exterior, and may easily lead to the establishment of new varieties.

The geographical area of the various species is mostly a very limited one, only a few are spread over various islands, and those always on islands quite close to one another. None that exist in one archipelago will be found in another. Most of them are limited to one island, many only to part of an island. For the *Placostyli* that live on the

ground, this is quite natural, as their specialization probably dates from the separation of the islands and all means of diffusion were taken away. For the *Charis*, which live on trees, spreading about would be more likely, but the want of large rivers, and the girth round each archipelago of coral reef, form here great obstacles to their dispersal by floating trees. We are, therefore, compelled to assume that the development of the various species has taken place in the present geographical epoch, although the root of the whole species reaches back to a time in which the four island groups were connected with each other more closely than now. Several species appear to be extinct and are now only found fossilized, but nothing as regards existence and propagation of the whole species justifies us in considering it as at all likely soon to be extinct.

New Caledonia, which is the home of the large, heavy *Placostyli*, is an island in the South Pacific, belonging to France, and lying about 720 miles east-north-east of the coast of Queensland. It is about 200 miles in length and 30 miles in breadth. It is of volcanic origin, and is traversed in the direction of its length by a range of mountains, which in some cases reach the height of 8000 feet, and is surrounded by sand banks and coral reefs. The coast is covered by considerable tracts of forest, but the mountains are barren and I presume this is the reason why most of these shells are only found near the coast.

From specimens I exhibit you will see how thin some of the *P. porphyrostomus* are until they have grown their full size, when they seem to keep thickening their shells as long as they live. The sub-fossil *P. semilis* having an extremely thick and heavy shell.

Thanks to the late Mr. E. L. Layard I am able to give you some information about these shells that may be new to you. He wrote "The *Placostyli* vary every 10—15 or 20 miles, each little sand-patch of an island, in the circling reef, will have its peculiar form or variety of *P. porphyrostomus* for instance, and along the shore they also change. This species seems confined to the sea-shore, I thought none were found on the Isle of Pines, but a friend sent me a shell from there, which I cannot separate well from *P. porphyrostomus*, and yet it has characteristics of *P. fibratus*, which is the shell of that island. Its varieties, too, are endless, from a dwarf of an inch or a little more (var. *aesopus*) to a giant of six inches long (var. *elongatus*). The Isle of Pines and the Loyalty Islands seem to have a characteristic to themselves and I think I could always tell a shell from them. I was puzzled at getting a shell (*P. edwardsianus*) from the coast of the main island (New Caledonia), then it occurred to me it was the east coast opposite the big island of Lifou, in the Loyalty group. Then I found out the Loyalty natives, in the old days, used to land at that spot to fight the New Caledonians, and, of course, they brought food

with them, part of it being snails, some of which escaped and became naturalized, but they exchanged a decomposed coral soil for a sandy one, and got changed by their surroundings, but I am convinced that *P. edwardsianus* as it is called, is only a variety of *P. insignis*, *P. ouveanus* and the Loyalty group."

To shew you how these so-called species run into one another, I again quote Mr. Layard: "*Placostylus souvillei*, *P. guestieri*, and some of the forms especially of *P. alexander* and *P. kanalensis* are, in my estimation, all one; but they slide into *P. cicatricosus* and through some of them into *P. mariei*, *P. scarabus* and the rest. Through *P. rossiteri* they merge into the thin group of *P. savesi*, *P. heinguenensis*, and *P. bavayi*. These are very rare and local, *P. heinguenensis* only being found at Heinguen, *P. savesi* not far from it, and *P. bavayi* only found at Mount Mon, miles away but nearer to *P. rossiteri*."

As an instance of the scarcity and difficulty of getting these shells, Mr. Layard says that some of the convicts escape at times and get into the mountain, where they would murder any European for the sake of his clothes, which would give them a better chance of escaping from the island. He had four natives collecting for him on Mount Mon, and they only got him five specimens of *P. bavayi* in a week.

Placostylus bovinus and var. *shongii* of New Zealand are evidently aberrant members of this group and there are traces of this form in many of the Fijian *Placostyli*, also in *P. fulgineus* from the New Hebrides (Vati and Tauna) and in the shells from Lord Howe Island and Rabbit Island, and you may trace it in *P. strangei*, *P. stutchburyi* and others, some of them have distinctly shown or indicated, the hump or tooth on the columellar lip, but the oddest thing is the occurrence of this tooth and the twist in the outer lip of *Diplomorpha layardi* and *D. delantouri* from the New Hebrides. The whole group suddenly ceases with that fine shell *P. cleryi*, away to the north in the Solomon Islands, which seems an exaggerated Fijian form, has (in some) traces of the hump and is so deciduous, that you will not get one in 500 shells with its green epidermis, which is much the color of many of the New Caledonian shells when very freshly taken in the forest.

Another curious thing: At Artillery Point, close to Noumea, is a bold headland, a kind of chalk or limestone, in which are found sub-fossil shells, said to be *P. savesi*, *P. guestieri*, and others, not now found living within one hundred miles. *P. savesi* was described from the sub-fossil form long before it was found living. *P. senilis*, another sub-fossil species, is found in a similar locality in the Isle of Pines. These sub-fossil species are becoming very rare, as they are burning the material for lime, and using it for the roads, so that hardly any perfect shells can now be found.

P. porphyrostomus and several other species are always decorticated

when adult, as they rub off the epidermis by burrowing in the hot sand, where they live near the seashore. I show you a specimen of an adult *P. porphyrostomus* completely decorticated, and an immature one showing the epidermis in beautiful condition. In other species which live in the damp forests, the epidermis seems to dry and peel off even in the cabinet, as you will see by the specimen I exhibit of *P. insignis*.

Mr. Layard's son was collecting *B. miltocheilus* in the Solomon Islands, and found it most difficult to see them on the leaves of the trees, as the animal is green and shows through the shell—a very good example of protective colouring.

The New Hebrides have not yet been fully worked for shells, as the natives are very savage and great cannibals. Only two species of *Placostylus* and two of *Charis* have so far been found, and these only in the southern part of the group. A new genus (*Diplomorpha* of Ancey) seems to take their place in the other islands of the group, specimens of which are exhibited to-night, as the Manchester Museum secured Mr. Layard's duplicates. The type of the genus is *Diplomorpha layardi* Brazier. There have so far only been four species of this genus discovered, and of one of them there is only one specimen known. One of the species is named after Monsieur de Latour, who with his son was collecting for Mr. Layard, and who were both murdered by the natives, and few Europeans have landed on the island since. The gentleman who collected and sent him the other died there of fever—not a very pleasant prospect to go collecting in a country like this.

Diplomorpha is closely allied to *Partula*, but the tooth and twist in the outer lip make them look like a diminutive *Placostylus*, and all the more so as they are terrestrial, whilst the *Partula* are arboreal. They undoubtedly are a link to the *Placostylus*.

And now, in conclusion, I wish to point out to you that as neither Australia nor New Guinea have any *Placostylus*, we may conclude that they have been separated from New Caledonia from a very remote period, as on the map you will see that down the coast of Australia there seems to be very deep water (2,600 fathoms), another fact pointing to there having been no connection between these lands in recent times.

The theory of a continent stretching across the Pacific to South America, I think we may dismiss at once, as the shells only seem somewhat similar in form, and these only to the species from localities furthest away from South America. As to all this *Placostylus* region having been one continent, I think that the shells hardly support the theory, as they differ so much amongst themselves in form and character.

The large heavy *Placostylus*, which I will call the true *Placostylus*, seems to be confined solely to New Caledonia and the Loyalty Islands, which are, comparatively speaking, new, although the species from New Zealand and Lord Howe Island approach them very closely, and may possibly have been introduced from New Caledonia.

The species from the Fiji Islands and Solomon Islands are, to my mind, very distinct from those of New Caledonia, and I should be inclined to separate them and put them into a section by themselves. The tree-loving *Charis* I should also raise to a section. In any event, their common ancestor must have been very remote. New Caledonia I think shows by its shell that it must have been separated from the other islands from a very remote period.

TWO POINTS IN NOMENCLATURE.

BY WILLIAM E. HOYLE.

(Read before the Society, June 11, 1902).

I.—CYPRINIADÆA *versus* CYPRINA.

IN reply to Mr. Newton's Note read before the last meeting of the Society it seems desirable to make the following observations in justification of the procedure adopted by the Committee. The generic name used by Linnæus for a fish was not *Cyprina* but *Cyprinus*. In order to ascertain whether these are mutually exclusive we refer to the Rules of Zoological Nomenclature and find that names which are etymologically alike and differ only in their spelling are to be rejected. *Cyprinus* is clearly the Latinized form of *κυπρίνος*, the name of a fish used by Aristotle, whilst *Cyprina* is a diminutive of *κύπρις*, a name of Aphrodite (see "Agassiz, Nomencl. Zool.," Moll., p. 28), hence the two names are allowable. Furthermore it is expressly stated in the rules laid down by the German Zoological Society for the guidance of the naturalists engaged in preparing "Das Tierreich" that *Picus* and *Pica* are both permissible, though zoologists are advised to refrain from coining names so much alike in the future. The Committee have to acknowledge the assistance of Dr. F. von Maehrenthal in elucidating this question.

II.—THE GENUS ANTIOPA.

The generic name *Antiopa* seems to have been used for Diptera by Meigen in 1800, and therefore cannot be properly used for Nudi-branchia as suggested by Alder and Hancock. The name *Antiopella* is therefore proposed in place of the latter.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

309th Meeting, April 9th, 1902.

Mr. E. C. Stump in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

Candidates Proposed for Membership

Mr. H. D. Gower; Dr. H. C. Sorby.

Papers Read.

"South African Notes," by E. W. Swanton.

"British Cephalopoda: their Nomenclature and Identification," by W. E. Hoyle.

Exhibits.

By Mr. J. H. Baldwin: *Limnea stagnalis* from Marple, Cheshire.

By Mr. L. St. G. Byne: Some very fine specimens of a green-tinted form of *Cypræa argus*, large *C. turdus*, and a beautiful series of dredged examples of *C. errones* var. *chrysophaea* Melv., all from the Red Sea.

By Mr. W. Moss: *Helix sinistrorsa* var., from Lifu.

By Mr. J. W. Jackson: *Vertigo pygmæa*, *Planorbis nautileus*, *Valvata piscinalis*, *Ancylus fluviatilis*, and *Velletia lacustris*, all from Marple, Cheshire; also a fine set of *Sphærium pallidum* taken recently from a pond at Droylsden.

Some extensive series of British local and varietal forms of *Sphærium* and *Pisidium*, with a few foreign examples for comparison, were shewn by Messrs. B. R. Lucas, J. W. Jackson, C. Oldham, and R. Standen. The specimens in the Society's collection and those in the Manchester Museum were also exhibited.

310th Meeting, May 14th, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

Donation to the Illustration Fund announced and thanks voted :

From Mr. H. Wallis Kew, 15/-.

Donations to the Cabinet announced and thanks voted :

Specimens of a pellucid variety of *Mytilus edulis* from Mr. Alfred Leicester.

New Members Elected.

Harry D. Gower, 55, Bensar Road, Croydon.

Henry Clifton Sorby, LL.D., F.R.S., Broomfield, Sheffield.

Candidates Proposed for Membership.

Mr. Travis Hampson; Mr. C. W. Vincent.

Papers Read.

"West American Cypræidæ," by F. L. Button (with prefatory note by L. St. G. Byne).

"On the genus *Gemma* Deshayes" by W. H. Dall.

"Note on a colour variety of *Cypræa argus*," by L. St. G. Byne.

"On the adoption of Rovereto's *Cypriniadea* for *Arctica* of Schumacher," by R. Bullen Newton.

"The Rock Pools of Donegal Bay," by R. Welch.

"Scalariform *Helix nemoralis*," by R. Welch.

"The section *Placostylus* of the genus *Bulinus*," by Ed. Collier.

Exhibits.

By Mr. A. Leicester: A remarkable series of *Mytilus edulis* taken from the bottoms of barges on the River Mersey. These specimens are markedly different from

the ordinary type of mussel. They are thin and semitransparent, mostly of a yellowish amber colour, sometimes veined with vivid green, and all beautifully clean and bright. Their general appearance is more that of *Modiolus* than *Mytilus*, and in many cases a peculiar flanging near the umbones occurs which gives the shells a winged appearance. The fact of the shells having to exist in brackish, or at times in comparatively fresh water, may have something to do with the production of such delicate specimens.

By Mr. R. Cairns: Sinistral *Helix pisana* from Toulon.

By Messrs. J. C. Melvill and R. Standen: Cypræidæ from Western America to illustrate Mr. Button's paper, all but two of the species dealt with being shewn.

By Mr. R. Welch: Platinotype photographs of scalariform *Helix nemoralis* from Bundoran, and of various molluscs and their habitats, to illustrate his two papers.

Special exhibit: The genus *Placostylus*. Most of the species known of this group of land shells were shewn from the collections of Messrs. Ed. Collier, R. Standen, B. R. Lucas, F. F. Laidlaw, F. Taylor, and the Manchester Museum (Layard duplicate collection). An explanatory and descriptive account of the genus was read by Mr. Collier.

Buckinghamshire Mollusca: New Records found at or near Aston Clinton, 1900-1901.—

Arion circumscriptus Johnst., in garden, back of house.

Limax flavus (L.), in garden, back of house.

Agriolimax agrestis L., var. *sylvatica* in garden.

A. agrestis L., var. *tristis* in garden.

Vitrina pellucida (Müll.), Daniel's Hole.

Helix pygmaea Drap., Daniel's Hole.

H. lamellata Jeffr., Daniel's Hole.

H. aculeata Müll., Daniel's Hole.

H. pulchella Müll., in garden, and the var. *costata*, in garden.

H. aspersa Müll., var. *conoidea*, in garden.

H. caperata Mont., Wendover Road and other roads.

Bulinus obscurus (Müll.), Daniel's Hole.

Pupa muscorum (L.), Daniel's Hole.

Vertigo pygmaea Drap., Daniel's Hole.

Cochlicopa lubrica (Müll.), in garden.

Carychium minimum Müll., Daniel's Hole.

Planorbis fontanus Lightfoot, Wilston Canal.

P. nautilus (L.), Wilston Reservoir.

P. contortus (L.), Wilston Reservoir.

Limnæa truncatula Müll., Halton Canal.

Unio tumidus Phil., Halton Canal.

Anodonta anatina (L.), Halton Canal.

Sphaerium lacustre Müll., Halton Canal.

—ALFRED LEICESTER (*Read before the Society*, Jan. 8, 1902).

The Hope and Castleton Ramble: Additional Note.—Since the above ramble I have again visited the Castleton district, and in the lane behind Hope Church I obtained the following species:—*Helix granulata*, *Hyalinia fulva*, *H. nitidula*, and *Carychium minimum*. In the River Noe I found *Limnæa peregra* and *L. truncatula*. *Limnæa peregra* was also common in a cattle pond above the Winnatts (1,700 ft.). I also found *Helix rotundata* var. *alba* in Cave Dale. As Mr. T. Hey in his list of "Derbyshire Mollusca," (*J. Conch.*, vol. 6, p. 116, 1889) and Rev. H. Milnes, in his later list (*J. Conch.*, vol. 7, p. 274, 1893) makes no mention of the occurrence of these species in this part of the county, it may be interesting to record them here.—J. W. JACKSON (*Read before the Society*, Oct. 9th, 1901).

THE CENSUS OF THE BRITISH LAND AND FRESHWATER MOLLUSCA.

BY LIONEL E. ADAMS.

(Read before the Society, June 11, 1902.)

It would be superfluous to point out the value of a complete Census showing the distribution of each species, and it is to be hoped that the present publication of the Census up to date will show conchologists where the gaps are that need filling up, and encourage them to assist in the work.

It will be noticed that Scotland is still very poorly explored, but that the Irish lists, on the other hand, are now very fairly full, mainly through the exertions of Messrs. R. Welch and P. H. Grierson.

The Society is also specially indebted to Miss Massey, Messrs. C. Wright, C. Oldham, De Vimes Kane, A. Shaw and T. Scott.

It will be remembered that the last Census, which was published in my "Collectors' Manual of British Land and Freshwater Shells," in 1896, was the compilation of Messrs. W. Denison Roebuck and John W. Taylor—a monument of valuable labour.

The great merit of the system of authentication is the uniformity of value which it gives to the records, all specimens passing under the eye of the recorder. It does not follow that other records are not equally reliable, but for the sake of uniformity of value it is necessary to confine the tables to such records as have been submitted to and passed by the Society's Referees, otherwise a wide door would have been opened to errors of determination, the avoidance of which is the object aimed at in instituting the authentication system.

The areas adopted are those proposed by Dr. H. C. Watson, and used by him in working out the distribution of the British Flora.

It is deemed sufficient to confine the tables to the distribution of species, that of varieties being for many reasons impracticable at the present time.

Conchologists who can furnish specimens for completing these tables are requested to send them to the Society's Recorder, Mr. Lionel E. Adams, 68, Wolverhampton Road, Stafford.

Though all specimens will be carefully returned if desired, correspondents are requested to say when sending shells for record purposes whether they wish them to be returned, and thus often save unnecessary trouble of postage.

| ENGLAND AND WALES. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|----|---|---|------------|---|---|----------|---|---|----|----|----|----|----|---------|----|----|----|----|----|----|----|-------|----|----|----|----|----|----|----|----|----|
| NAME OF SPECIES. | C. | | | Peninsula. | | | Channel. | | | | | | | | Thames. | | | | | | | | Ouse. | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| Channel Islands | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 1 Cornwall W. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 2 Cornwall E. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 3 Devon S. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 4 Devon N. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 5 Somerset S. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 6 Somerset N. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 7 Wiltshire N. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 8 Wiltshire S. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 9 Dorset | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 10 Isle of Wight | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 11 Hants S. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 12 Hants N. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 13 Sussex W. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 14 Sussex E. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 15 Kent E. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 16 Kent W. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 17 Surrey | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 18 Essex S. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 19 Essex N. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 20 Hertford | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 21 Middlesex | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 22 Berkshire | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 23 Oxford | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 24 Bucks. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 25 Suffolk E. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 26 Suffolk W. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 27 Norfolk E. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 28 Norfolk W. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 29 Cambridge | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 30 Bedford | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 31 Huntingdon | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 32 Northampton | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| H. allaria | ... | C | 1 | ... | 3 | 4 | 5 | 6 | ... | ... | ... | 11 | 12 | 13 | 14 | ... | 16 | 17 | 18 | ... | 20 | ... | 22 | 23 | ... | 25 | 26 | ... | 28 | ... | 32 | | | | | |
| H. nitidula | ... | C | 1 | ... | 3 | 4 | 5 | 6 | ... | 8 | 9 | 10 | 11 | 12 | 13 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | ... | 32 | | |
| H. radiatula | ... | ... | ... | ... | ... | ... | ... | 6 | ... | ... | ... | 10 | ... | 12 | 13 | ... | ... | 16 | 17 | ... | 19 | ... | 21 | ... | ... | ... | 25 | 26 | ... | 28 | ... | 32 | | | | |
| H. pura | ... | C | 1 | ... | 3 | ... | 5 | 6 | ... | 8 | ... | 10 | 11 | 12 | 13 | ... | ... | 16 | 17 | 18 | 19 | 20 | ... | 22 | ... | ... | 25 | 26 | ... | 28 | 29 | ... | 31 | 32 | | |
| H. crystallina | ... | ... | ... | ... | 3 | ... | 5 | 6 | 7 | ... | 9 | ... | 11 | 12 | 13 | ... | ... | 16 | 17 | ... | 19 | 20 | 21 | 22 | ... | ... | 25 | 26 | 27 | 28 | 29 | 30 | ... | 32 | | |
| H. fulva | ... | ... | ... | ... | 3 | ... | ... | 6 | 7 | ... | 9 | ... | 11 | 12 | 13 | ... | ... | 17 | 18 | ... | 20 | 21 | 22 | ... | ... | 25 | 26 | 27 | ... | ... | ... | ... | 32 | | | |
| H. nitida | ... | ... | 2 | 3 | ... | ... | ... | 6 | ... | ... | ... | 11 | ... | 13 | ... | ... | 15 | 16 | 17 | ... | 19 | 20 | 21 | 22 | ... | 25 | 26 | 27 | ... | 30 | 31 | 32 | | | | |
| H. excavata | ... | ... | 1 | ... | 3 | ... | ... | ... | ... | ... | ... | 11 | ... | 13 | ... | ... | ... | 16 | 17 | ... | 19 | 20 | ... | 23 | ... | ... | 25 | 26 | 27 | ... | ... | ... | 32 | | | |
| Helix rotundata | ... | C | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | |
| H. rupestris | ... | C | 1 | ... | 3 | ... | ... | 6 | ... | ... | 9 | ... | 11 | ... | 13 | 14 | ... | 15 | 16 | 17 | ... | 20 | ... | 22 | 23 | ... | ... | 25 | 26 | ... | ... | ... | ... | 32 | | |
| H. pygmaea | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 11 | 12 | 13 | ... | ... | 15 | ... | 18 | ... | ... | ... | ... | 22 | 23 | 24 | 25 | 26 | ... | 28 | ... | ... | 32 | | | |
| H. lamellata | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | | |
| H. aculeata | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 9 | 10 | 11 | 12 | 13 | 14 | ... | ... | 16 | 17 | 18 | ... | 20 | ... | 22 | 23 | ... | 25 | 26 | 27 | 28 | ... | ... | 32 | | |
| H. pulchella | ... | C | 1 | ... | 3 | ... | ... | 6 | 7 | ... | ... | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | ... | 19 | ... | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | | |
| H. lapicida | ... | ... | ... | 3 | 4 | ... | ... | 6 | ... | ... | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | ... | 22 | 23 | 24 | ... | 27 | ... | ... | 30 | ... | 32 | | |
| H. obvoluta | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 15 | 16 | 17 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | | |
| H. pomatia | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 15 | 16 | 17 | ... | 20 | ... | ... | 23 | ... | ... | ... | ... | ... | ... | 30 | ... | 32 | | |
| H. aspersa | ... | C | 1 | 2 | 3 | 4 | 5 | 6 | ... | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | |
| H. nemoralis | ... | C | 1 | 2 | 3 | 4 | 5 | 6 | ... | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | ... | 32 | |
| H. hortensis | ... | C | 1 | 2 | 3 | 4 | 5 | 6 | ... | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | |
| H. arbustorum | ... | ... | 2 | 3 | ... | ... | ... | 6 | ... | ... | 9 | 10 | 11 | ... | 13 | 14 | ... | 15 | 16 | 17 | ... | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | ... | 31 | 32 | |
| H. cantiana | ... | C | ... | 3 | ... | 5 | 6 | ... | ... | ... | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | ... | 32 | |
| H. cartusiana | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 13 | 14 | ... | 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 27 | ... | ... | ... | ... | 32 | | |
| H. rufescens | ... | ... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | ... | 19 | 20 | 21 | 22 | 23 | 24 | ... | 26 | 27 | 28 | 29 | 30 | ... | 32 | |
| H. hispida | ... | C | 1 | ... | 3 | ... | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | |
| H. granulata | ... | ... | 1 | 2 | 3 | ... | ... | ... | ... | ... | ... | ... | 11 | 12 | ... | ... | ... | 15 | ... | ... | ... | 19 | 20 | 21 | ... | 23 | ... | ... | ... | ... | ... | ... | ... | 32 | | |
| H. revelata | ... | C | 1 | 2 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 27 | ... | 29 | 30 | ... | 32 | | |
| H. fusca | ... | ... | ... | 3 | ... | 5 | 6 | ... | ... | ... | ... | 11 | 12 | 13 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | |
| H. pisana | ... | C | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | |
| H. itala | ... | ... | 1 | ... | ... | ... | ... | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | ... | 19 | 20 | ... | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | ... | 32 | |
| H. caperata | ... | C | 1 | 2 | 3 | 4 | 5 | 6 | ... | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | ... | 30 | ... | 32 | |
| H. virgata | ... | C | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | |
| H. terrestris | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | |
| H. acuta | ... | C | 1 | 2 | 3 | 4 | ... | 6 | ... | ... | 9 | 10 | ... | ... | ... | 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 |
| Buliminus montanus | ... | ... | ... | ... | ... | ... | ... | 6 | ... | ... | ... | ... | ... | 12 | 13 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 |
| B. obscurus | ... | C | 1 | ... | 3 | 4 | ... | 6 | ... | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | 15 | 16 | 17 | ... | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | ... | 32 | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| P. contortus ... | ... | ... | ... | 6 | 7 | ... | 9 | 10 | 11 | ... | 13 | ... | 15 | 16 | 17 | ... | 19 | 20 | 21 | 22 | 23 | ... | ... | 27 | 28 | 29 | 30 | 31 | 32 | | | |
| Aplexa hypnorum | C | ... | 3 | 6 | 6 | ... | ... | ... | 11 | ... | 13 | ... | ... | 16 | ... | ... | 18 | 19 | ... | ... | ... | ... | ... | ... | 27 | 28 | 29 | ... | 31 | ... | | |
| Physa fontinalis | ... | ... | 3 | 6 | 6 | ... | 9 | ... | 11 | ... | 13 | ... | 15 | 16 | 17 | 18 | 19 | ... | 21 | 22 | 23 | 24 | 25 | 27 | 28 | 29 | 30 | 31 | 32 | | | |
| Amphipelea glutinosa | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 15 | ... | ... | ... | ... | ... | ... | 22 | 24 | ... | 27 | ... | ... | ... | ... | 31 | ... | | | |
| Limnea involuta | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | | |
| L. peregra ... | C | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ... | ... | ... | ... | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | | |
| L. stagnalis ... | ... | ... | 3 | ... | 6 | 7 | ... | ... | ... | 11 | ... | 13 | ... | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 27 | 28 | ... | 30 | ... | 32 | | |
| L. agustalis ... | ... | ... | ... | 5 | 6 | ... | 8 | 9 | ... | 11 | ... | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 27 | 28 | 29 | 30 | ... | 32 | | |
| L. palustris ... | C | 1 | ... | 3 | ... | 6 | 7 | ... | 9 | ... | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 25 | 27 | 28 | 29 | ... | 31 | 32 | | |
| L. truncatula ... | C | 1 | ... | 3 | 4 | 5 | 6 | ... | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | ... | 21 | 22 | 23 | 25 | 27 | 28 | 29 | ... | 31 | 32 | | |
| L. glabra ... | C | 1 | ... | ... | ... | ... | 9 | ... | 11 | ... | ... | ... | ... | 16 | ... | ... | 19 | ... | ... | ... | ... | ... | 25 | 27 | 28 | 29 | 30 | 31 | 32 | | | |
| Ancylus fluviatilis | ... | ... | 1 | 2 | 3 | 4 | 5 | 6 | ... | 8 | 9 | ... | 11 | 12 | 13 | 14 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Velletia lacustris | ... | ... | 3 | ... | 6 | 7 | ... | 9 | ... | 11 | ... | 13 | ... | 16 | ... | 18 | 19 | 20 | 21 | 22 | 23 | ... | ... | 26 | 27 | 28 | 29 | 30 | 31 | 32 | | |
| Cyclostoma elegans | ... | 1 | ... | 3 | 4 | ... | 6 | ... | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | ... | 20 | ... | 22 | 23 | 24 | ... | 27 | 28 | 29 | 30 | ... | 32 | |
| Acicula lineata | ... | ... | ... | ... | 6 | ... | 9 | 10 | ... | ... | ... | ... | ... | 15 | ... | ... | ... | ... | ... | 22 | 23 | ... | ... | ... | ... | ... | ... | ... | ... | ... | | |
| Neritina fluviatilis | ... | 1 | ... | 3 | ... | 6 | ... | 9 | ... | 11 | ... | 13 | 14 | ... | 16 | 17 | 18 | 19 | 20 | 21 | ... | 22 | 23 | 24 | ... | 27 | 28 | 29 | 30 | 31 | 32 | |
| Vivipara contecta | ... | ... | ... | ... | ... | ... | ... | ... | 11 | ... | ... | ... | ... | ... | 16 | 17 | 18 | 19 | 20 | 21 | ... | 22 | 23 | 24 | 25 | 27 | 28 | 29 | ... | 31 | 32 | |
| V. vivipara ... | ... | ... | 3 | ... | ... | ... | ... | ... | ... | ... | 13 | ... | ... | ... | 16 | 17 | 18 | 19 | 20 | 21 | ... | 22 | 23 | 24 | 25 | 27 | 28 | 29 | ... | 31 | 32 | |
| Bythinia tentaculata | ... | 1 | ... | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 27 | 28 | 29 | 30 | 31 | 32 |
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| A. anatina ... | ... | ... | ... | ... | 6 | ... | 8 | ... | 11 | ... | ... | ... | ... | 17 | 18 | 19 | 20 | 21 | ... | 22 | 23 | 24 | 25 | 27 | 28 | ... | 30 | ... | ... | ... | 32 | |
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| S. rivicola ... | ... | ... | ... | ... | 6 | ... | ... | ... | ... | ... | ... | ... | ... | 17 | 17 | ... | 19 | 20 | 21 | 22 | 23 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
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| S. lacustre ... | ... | ... | 3 | ... | 6 | 7 | ... | 9 | ... | 11 | 12 | 13 | ... | 15 | 16 | 17 | 18 | 19 | ... | 21 | 22 | ... | ... | ... | 27 | 28 | ... | 30 | 31 | 32 | | |
| Pisidium annicum | ... | ... | 3 | ... | 6 | ... | 9 | ... | 11 | ... | 13 | ... | ... | ... | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | ... | ... | 27 | 28 | 29 | ... | ... | ... | 32 | |
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| P. pusillum ... | C | 1 | ... | 3 | 4 | ... | 6 | 7 | ... | 9 | ... | 11 | 12 | 13 | 14 | 15 | 16 | 17 | ... | 20 | 21 | 23 | ... | 25 | 26 | 27 | 28 | ... | 30 | ... | 32 | |
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|-----------------------|--------------------|------------------|--------------|--------------|---------------|-------------|--------------|-----------|---------------|--------|
| | Severn. | | | South Wales. | | | North Wales. | | | Trent. |
| | 33 Gloucester E. | 34 Gloucester W. | 35 Monmouth. | 36 Hereford. | 37 Worcester. | 38 Warwick. | 39 Stafford. | 40 Salop. | 41 Glamorgan. | |
| Arion ater | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
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| A. minimus | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| A. hortensis | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| A. circumscriptus | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Geomalacus maculosus | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Amalia gagates | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| A. sowerbyi | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
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| L. cinereo-niger | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| L. flavus | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| L. marginatus | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Agriolimax agrestis | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| A. laevis | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Testacella haliotidea | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| T. scutulum | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| T. maugei | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Virgina pellucida | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Hyalinia draparnaldi | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| H. cellaria | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
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| H. allaria | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
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| | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 |
| | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 |
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| | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 |
| | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 |
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| | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 |
| | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 |
| | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 |
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| | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 |
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* Want of space compels the omission of the figure 1 before each record; thus 13 should read 113, 14 read 114, etc.

NAME OF SPECIES.

| | | | | | | | | | | |
|-------------------------|---|-----------------------------|-----------|--------------|-----------------|-----------|--------------------------------|-----------------|--------------|--------------|
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| V. pusilla ... | 13 14 ... | 19 ... | 21 ... | 24 ... | 27 ... | 31 32 ... | 36 ... | 39 ... | 42 ... | 48 ... |
| V. angustior ... | 13 14 ... | 20 ... | 21 ... | 24 ... | 27 ... | 31 32 ... | 36 ... | 40 ... | 44 ... | 48 ... |
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| Balea perversa ... | 13 14 15 16 17 18 19 20 21 22 23 24 ... | 20 21 ... | 21 ... | 24 ... | 27 ... | 31 32 ... | 36 ... | 40 ... | 44 ... | 48 ... |
| Clausilia bidentata ... | 13 14 15 ... | 20 21 ... | 21 ... | 24 ... | 27 ... | 31 32 ... | 36 ... | 40 ... | 44 ... | 48 ... |
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| C. biplicata ... | 13 14 15 ... | 20 21 ... | 21 ... | 24 ... | 27 ... | 31 32 ... | 36 ... | 40 ... | 44 ... | 48 ... |
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| Cochlicopa lubrica ... | 13 14 15 ... | 17 18 ... | 20 21 ... | 22 23 24 ... | 28 29 ... | 32 ... | 35 36 37 38 39 40 41 ... | 39 40 41 ... | 44 ... | 45 46 47 ... |
| Cacilioides acicula ... | 13 14 15 ... | 17 ... | 20 21 ... | 23 24 ... | 27 ... | 32 ... | 35 ... | 38 ... | 44 45 ... | 47 48 ... |
| Succinea putris ... | 13 14 15 ... | 17 18 19 20 21 22 23 24 ... | 20 21 ... | 23 24 ... | 27 ... | 32 ... | 35 ... | 38 ... | 44 45 ... | 47 48 ... |
| S. elegans ... | 13 14 15 ... | 17 18 19 20 21 22 23 24 ... | 20 21 ... | 23 24 ... | 27 ... | 32 ... | 36 ... | 40 ... | 44 45 ... | 48 ... |
| S. oblonga ... | 13 14 15 ... | 18 ... | 20 21 ... | 23 24 ... | 27 ... | 32 ... | 36 ... | 40 ... | 44 ... | 47 48 ... |
| Carychium minimum ... | 13 14 15 ... | 18 ... | 20 21 ... | 23 24 ... | 27 ... | 32 ... | 36 ... | 40 ... | 44 ... | 47 48 ... |
| Segmentina nitida ... | 15 ... | 20 ... | 21 ... | 24 ... | 27 ... | 32 ... | 36 ... | 40 ... | 44 ... | 47 ... |
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| P. nautilius ... | 15 ... | 20 ... | 21 ... | 24 ... | 27 ... | 32 ... | 36 ... | 40 ... | 44 ... | 47 ... |
| P. dilatatus ... | 15 ... | 20 ... | 21 ... | 24 ... | 27 ... | 32 ... | 36 ... | 40 ... | 44 ... | 47 ... |
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| P. contortus ... | 13 ... | 17 ... | 19 ... | 23 24 ... | 27 ... | 31 ... | 36 38 ... | 40 ... | 41 42 44 ... | 47 48 ... |

ON THE GENUS *GEMMA*, DESHAYES.

By WILLIAM HEALEY DALL.

(Read before the Society, May 14, 1902).

IN 1834¹ Capt. J. G. Totten described under the name of *Venus gemma* the pretty little shell which is the subject of these remarks. His description is as follows:—"Shell subrotund, nearly equilateral, concentrically furrowed, glossy, anterior portion and basal margin, both within and without, white or pale reddish violet, remainder reddish purple, darker at and near the superior and posterior margins; no lunule; beaks small, incurved, separate, generally eroded; teeth divergent, the medial tooth of each valve stout, triangular, the anterior tooth of the right and the posterior of the left valve, thin and not easily distinguished; inner margin crenulate. Length 0.15 of an inch. The length being represented by 13, the breadth [height] will be 12, and the diameter 6."

"Inhabits the coast of Massachusetts and Rhode Island."

"I found this beautiful little shell first on the beach at Provincetown, Cape Cod (Mass.); it has since been found in Newport Harbour. The largest specimen I have seen among many hundreds is barely $\frac{3}{20}$ of an inch in length; the more common length being about $\frac{1}{10}$ of an inch. It is often much eroded on the disks and then the colour is bluish white."

Capt. Totten's figures are in a coarse woolly lithography, the engraver does not indicate the crenulations of the margin or the lateral teeth. The form figured is that from Massachusetts Bay. In this description the cardinal teeth are correctly described, but the laterals, and the faint boundary of the lunular area, were not noted.

In 1842 H. C. Lea² describes *Cyrena purpurea* from Delaware Bay, saying that he had supposed it to be the same as Totten's *Venus gemma*, but on examination found that the hinge "is like that of *Cyrena*," and the internal margin not crenulate. This indicates that he had correctly identified the teeth which are like those of *Cyrena*, except that the laterals in *Gemma* are relatively weaker and the cardinals are not bifid or grooved. The crenulation of the margin is present or absent at different stages of growth in the same specimens. As a matter of fact Lea's *C. purpurea* is a young specimen of the southern sub-species of *V. gemma*. His types, from the collection of Dr. Isaac Lea, are now in the National Museum. They are so small and internally polished that the sinuated pallial line is not visible.

1 *Amer. Journ. Sci.*, vol. 26, p. 367, fig. 2, a, b, c, d, Nov., 1834.

2 *Amer. Journ. Sci.*, vol. 42, p. 106, pl. 1, fig. 1.

Gould says¹ under *Venus*, which is defined as having three cardinal teeth in each valve, *Venus gemma* (fig. 51) has "no defined lunule," "teeth divergent, the middle one in each valve stout and triangular, the anterior tooth of the right, and the posterior one of the left valve thin and not easily distinguished." He does not mention the lateral teeth, though he indicates the grooving of the anterior lateral margin in his figure of the left valve, which is not particularly characteristic, being mostly copied from that of Totten. In 1842 Dr. Gould² refers the then recently described *Cyrena purpurea* H. C. Lea, from Delaware Bay, to a small specimen of *Venus gemma* Totten.

Gould's (1841) description is copied and the shell very badly figured by DeKay.³ In the same year Dr. Mighels⁴ referred to it as an abundant littoral shell on sandy or muddy shores all along the coast of Maine.

In the supplement to Jay's "Catalogue of Shells in his collection," printed in 1852 (Ed. 4, suppl. p. 466), the name "*Venus manhattanensis*, Prime, Mss.," appears but without any description or figure.

In 1853, Deshayes⁵ creates the genus *Gemma*, not knowing the soft parts; he places it next *Mercenaria*, in the section *Venusina*, or typical *Veneridæ*, without lateral teeth. He allows the new genus two cardinal teeth in the right valve and three in the left valve, and says nothing of the lunule.

In 1883, Sowerby figures the Massachusetts Bay form.⁶ A few years later H. & A. Adams, quoting their text and locating *Gemma* after Deshayes, figure the shell of a Massachusetts Bay specimen. The drawing has been modified on the plate after it was first engraved, but does not clearly exhibit the true characters of the hinge, and probably was made from an imperfect specimen. They adopt the name of *Gemma gemma*, as used by Deshayes.

Following the example of many of the older naturalists when a specific name had been taken for generic use, Stimpson⁷ proposed a new specific name *Tottenii* for the *Venus gemma* of Totten and the *Gemma gemma* of Deshayes.

In 1862, Prime⁸ described and figured the *Venus manhattanensis* mentioned ten years before in Jay's "Catalogue," under the name of *Venus (Gemma) manhattanensis*. According to Prime, his species differed from the type of the genus in being "smaller, more triangular,

¹ "Invertebrata of Massachusetts," 1841, p. 88.

² *Proc. Boston Soc. Nat. Hist.*, vol. 1, p. 61.

³ "New York Mollusca," p. 218, pl. 27, fig. 177, 1843.

⁴ *Boston Journ. Nat. Hist.*, vol. 4, p. 321.

⁵ "Cat. Conch. Brit. Mus.," part 1, pp. 112-113.

⁶ *Thesaurus*, Monograph of *Venus*, vol. 2, pl. 158, fig. 141, p. 737.

⁷ "Check List of Shells of the East Coast of North America," published by the Smithsonian Institution in June, 1860, p. 3, no. 174.

⁸ *Ann. Lyceum Nat. Hist. N.Y.*, vol. 7, p. 482.

less full, less elongated," the concentric striæ "coarser and more distant" and in its "uniform white color." The figure, magnified nine times, is bad. The hinge is incomprehensible, the concentric sculpture is represented as very fine. Nothing is said about a lunule or the number of teeth, though the figure looks as if the draughtsman had intended to represent lateral teeth.

The specimens, supposed to be of this form, which I have seen, are all less flat and *more* inflated than the Massachusetts variety, instead of *less* so, and therefore cannot be typical.

In 1869, Perkins,¹ on the ground that the British Association rules forbid the use of a specific name for generic purposes, rejects *Gemma* Deshayes and substitutes *Tottenia*, which by a typographical error is printed *Totteniana* in his text, though corrected in the errata. He calls the species collected in the vicinity of New Haven *Tottenia gemma*. He adds to our knowledge of the animal the important information that it is viviparous, producing over thirty young to the individual mother. The young were well formed in January.

In 1870, Binney,² under *Gemma*, gives a translation of Deshayes' Latin generic diagnosis and notes (from information furnished by Stimpson) that the animal has the siphons connate, the anal one valvular, the lower one longer and fringed, and the "foot semilunar." Under *Gemma gemma* the Massachusetts form is figured, but Gould's text of 1841 which does not harmonize with the Deshayesian diagnosis is retained unchanged. *G. manhattanensis* is treated as a distinct species, Prime's figure and remarks being practically reproduced.

In Tryon,³ the genus *Gemma* is adopted with the Deshayesian diagnosis, and no new information is added.

By Prof. Verrill,⁴ the name *Tottenia* is adopted for the genus. *T. gemma* is stated to extend from South Carolina to Labrador, and *T. manhattanensis*, regarded as questionably distinct, from North Carolina to Vineyard Sound. An allied species *T. spherica* (*Cytherea spherica*, H. C. Lea)⁵ is stated to exist in the Miocene of Virginia.⁶ It is noted that some specimens of *T. manhattanensis* are purplish and others straw color, and that its specific distinctness is doubtful.

It will be seen from the preceding historical review that a complete and correct description of this little shell is nowhere to be found and that all accounts hitherto published are more or less deficient even if untinctured with actual error.

¹ *Proc. Boston Soc. Nat. Hist.*, vol. 13, p. 148.

² Gould's "Invertebrata of Massachusetts," pp. 137-138.

³ "American Marine Conchology," 1873.

⁴ "Report on the Invertebrate Animals of Vineyard Sound," *Rep. U. S. Fish Comm.* for 1871-2, p. 683, 1873.

⁵ *Trans. Amer. Phil. Soc.*, series 2, vol. 9, p. 15, pl. 34, fig. 22, 1843.

⁶ This proves to be a small species of *Diplodonta*.

As regards the name, while the repetition of *Gemma* is objectionable from an æsthetic standpoint, I hold that this is insufficient to cause its rejection. Such a rule would upset hundreds of genera in current use, given by Linné, Lamarck, Cuvier and other most distinguished and classical authorities and in no way benefit science. The British Association paragraph should be accepted as a useful suggestion, but cannot be erected into an ex post facto law. From Deshayes' original manuscripts in my possession I know that his genus was originally written *Gemmula*, but how it came to be printed *Gemma* is now past finding out.

The original *Venus gemma* of Totten included two forms, of which the extremes are very well marked; though the connecting variations are so numerous that they can hardly be regarded as of higher rank than subspecies. One of these is the form which extends from Long Island Sound to Labrador, and which for convenience we may regard as the subspecies *Tottenii* of Stimpson. The other extends from Jupiter Inlet, south-east Florida, to Cape Cod. In the vicinity of Cape Cod and around to New York Bay these forms are found more or less intermingled and intergraded. Either of them may vary from purple to pale straw colour. Lea's *Cyrena purpurea* is a young specimen of the southern form. Prime's *Venus manhattanensis* is a white, compressed variety of the same. The specimens usually named *manhattanensis* are only white specimens of either subspecies. A manuscript note of Stimpson's states that Totten's cabinet specimens were purple like adult *purpurea*, but his original description evidently included both, and his figure is the oval *Tottenii* variety.

GEMMA GEMMA (Totten).

Gemma gemma subsp. *tottenii* Stm.

Trans. Wagner Inst., vol. 3, pt. 4, pl. 24, figs. 1, 3, 1898.

This shell is oval, rather compressed, with a faintly marked lanceolate lunule, flattish often irregular or obsolete concentric waves, glistening surface and generally eroded beaks. The pallial sinus averages higher and more acute than in the southern form but is variable. The dentition is exactly the same. The colours vary through the same range. The ligament is a little longer proportionately than in the southern form.

Gemma gemma subsp. *purpurea* Lea.

Trans. Wagner Inst., vol. 3, pt. 4, pl. 24, figs. 2, 4, 4b, 1898.

This shell is rounded triangular, inflated, with more prominent beaks, wider lunule and shorter ligament. The concentric sculpture is in smaller waves, but they are much more prominent, regular and conspicuous. I have seen none of this shape with obsolete waves as

is often the case in *tottenii*. The pallial sinus averages smaller and more rounded apically. This form is also paler on the whole than the *tottenii*, and more frequently straw colour or entirely free from purple, though sometimes quite dark colored.

The following proportional (not actual) measurements in millimetres indicate the differences:—

| | <i>G. tottenii.</i> | <i>G. purpurea.</i> |
|--|---------------------|---------------------|
| Length | 39'0 | 39'0 |
| Height | 34'0 | 35'0 |
| Diameter | 21'0 | 28'5 |
| Height of the line of greatest length above level of base | 14'5 | 12'0 |

The figures above cited are from typical examples measured on magnified outlines secured by a camera lucida.

The strongly sculptured southern form of *G. purpurea* was referred to *Parastarte*¹ under the manuscript name of *P. concentrica*. I was led into this error by the erroneous descriptions of the hinge of *Gemma* given in the text books, and by the fact that, except that it has lost the feeble cardinal tooth in each valve, the hinge in the *Parastarte* is the same, and both are similarly colored and viviparous.

The correct description of the hinge of *Gemma purpurea*, in good order and fully developed, is as follows:—Right valve: anterior cardinal margin with a small sharp ridge representing an anterior lateral tooth, in the same radiating line from the beak as the anterior cardinal, but the lower end of the anterior cardinal and the upper end of the anterior lateral are separated by a distinct gap; the anterior cardinal is thin, elongated and rather feeble; the middle cardinal is strong and triangular; the posterior cardinal is lamellar and distinct; the posterior margin is deeply grooved to receive the posterior lateral of the opposite valve. Left valve:—anterior margin grooved for the lateral of the right valve; anterior and middle cardinal teeth stout and triangular but not so short as the middle cardinal of the right valve; posterior cardinal elongated, feeble; posterior margin raised into a feeble ridge representing a posterior lateral. *Summary*: each valve has two strong and one faint cardinal, one lateral tooth, and one groove for the opposite lateral. The anterior cardinal in the right valve and the posterior one in the left are feeble. Formula $\frac{L1.101010.0}{R0.010101.1}$

The feeble teeth are often broken off, and sometimes undeveloped in the young, or obsolete in eroded adults. A perfectly developed and uninjured adult will always show the above described dentition.

The siphons are wholly disunited, the anal is shorter, hyaline, with a protruding valve when extended; the branchial is fringed at its

termination with papillæ, is darker, pinkish and longer than the other.

The siphonal muscles leave a rather elongated erect scar or pallial sinus on the shell, usually angulated in variety *totteni*, but more rounded in the variety *purpurea*.

The foot is of the usual shape, rather long and narrow, slightly marginated below.

The lunular boundary, though faint, is traceable and encloses a cordiform space extending over two-thirds of the way from the beaks to the anterior end of the valves. The figures indicate its proportion.

The animal is viviparous, living near the shore or between tide-marks, on a sandy or muddy bottom. No species is positively known except from Eastern North America, but lately specimens have been obtained from ground in California, where eastern "seed" oysters had planted, and where the species has evidently been introduced with the mud adhering to the young oysters.

The nearest relative of *Gemma* is the genus *Parastarte* Conrad, 1862, which differs chiefly by its obsolete pallial sinus, and the absence of the left posterior cardinal tooth. Concurrently the lateral grooving of the margins is less distinct and it is probable that the siphons are reduced to mere orifices.

On the Pacific coast we find taking the place of *Gemma* the little genus *Psephis* Carpenter, 1864, a name preoccupied ten years earlier in Lepidoptera by Guenée, and which I propose to replace by *Psephidia*. Carpenter's type was *P. lordi* Baird from the Vancouver district. It has three simple unsulcate cardinal teeth in each valve, while the anterior left and posterior right dorsal margin, outside the hinge plate, is grooved to receive the bevelled edge of the opposite valve; the inner margins of the valves are not crenate, and there is a well-marked rounded pallial sinus. The little *Venus tantilla* of Gould, which has been widely distributed under the name of *Psephis*, has a different hinge from *P. lordi*, and cannot remain in the same genus. It is very close to *Transennella*.

The three genera above cited will form a sub-family of Veneridæ, which I have called *Gemminæ*, characterized by small size, viviparity, and other less striking characters. So far as known it is an exclusively American group and is represented in our Tertiaries as early as the Oligocene.

Cyprina v. Cypriniadea.—Referring to Mr. Hoyle's note (*antea* p. 214) I should like to say that besides the derivation theory for the retention of both *Cyprinus* and *Cyprina* in zoological nomenclature, we have to consider distinctiveness of name. To prevent confusion, therefore, in the compilation of faunal lists it is certainly a judicious policy to favour the adoption of *Cypriniadea*—R. BULLEN NEWTON.

SCALARIFORM HELIX NEMORALIS.

BY R. WELCH.

(Read before the Society, May 14th, 1902).

PLATE II.

WHILE collecting information some years ago about the large number of sinistral forms of this species that are regularly found near Bundoran, Co. Donegal,¹ I found that a fair number of very high-spined and really good scalariform specimens also appeared at the rate of three or four per annum. These, like the reversed examples, are picked out of the many thousands of the ordinary form that are collected for necklace making in the hollows of the Finner Dunes by old peasant women. These necklaces, like those at Southport and Blackpool, are sold to summer visitors, but the "sports" are reserved for various special "markets" and are passed on regularly to a favoured few. The old women sometimes call them "spiders," "spidery" being sometimes used in the north of Ireland for anything slender or tall.

I have now obtained records of about forty shells that were truly scalariform, and a rather larger number that were very high in the spire; they vary very much both in size and shape, some having a much deeper suture than others, but these are not necessarily the highest specimens (Pl. II., fig. 20).

For instance, a fine rich olive-coloured shell, from Mr. Brockton Tomlin's collection, is not a high-spined form, yet it has the deepest suture and roundest whorls of any I have seen. In the plate I have arranged a graduated series, from fig. 1, a mere high-spined form, to fig. 16, a fine shell, 34 mm. high, also from Mr. Tomlin's collection. This is the finest "sport" of this species that has come under my notice. A few years ago I had not seen any of these perfectly fresh with epidermis intact, but during the last two years friends have obtained several, Mr. W. A. Green, of Belfast, having been fortunate enough to collect one alive not far from the Fairy Bridges, and there are several in the Tomlin collection from which the majority shown on my plate were selected, the remainder being from Mr. W. Swanston's or my own. The specimens figs. 17-19 on the plate seem to have been normal up to the time the animals received some injury, after which they finished the shell in a more or less scalariform shape. Fig. 19 is an especially curious shell, the final whorl having turned down sharply almost at right angles to the rest, forming a rough, rather angular mouth. The banding is as varied as in the normal form, and some have the very fine or dotted band 10000 or 02000 so characteristic of many Bundoran specimens:

¹ *Irish Naturalist*, vol. 9, p. 163, 1900.

Some collectors of great experience consider that the large number of these, and especially of reversed examples found at Bundoran, are the result of the very large number of shells collected for necklace making compared with other places. Yet, it is curious that of all the many tens of thousands of this species that my friends and I have examined, mainly on our northern and eastern dunes, Mr. Green should be the only one to find a real scalariform specimen, and that at Bundoran very shortly after his arrival on the spot.

Though necklaces are also made by the old women of *Helix acuta* and *H. ericetorum*, the only good "sports" I could get records of were four reversed specimens of the latter, which is nothing like so plentiful as *H. nemoralis*. I cannot help thinking that much larger quantities of this species have been used for the Blackpool and Southport "trippers" necklaces than for those at Bundoran. Yet the few records I have from there were not obtained in this way, but collected by Mr. R. Drummond, of Blackpool (*antea* p. 91) or his brother, who has just recently found another scalariform specimen at Ainsdale, near Southport. Now, with regard to these Lancashire necklaces, my friend, Mr. R. Standen, informs me that for many years past, indeed probably ever since Blackpool and its sister watering-places became the haunt of the day or week-end "tripper," necklaces of shells have been exposed for sale in great numbers, and the "trippers" in course of time came to look upon the purchase of these souvenirs as the orthodox thing to do, and a guarantee that their annual sea-side trip had been a substantial fact. His earliest recollections of these necklaces date back some thirty odd years, and at that time they were composed of dead *Helix nemoralis* and *Turritella communis* (known locally as "cockspurs") threaded alternately. Of late years, as the supply of wind-blown shells of *Helix* became less abundant on the sand dunes in the vicinity of the towns and *Turritella* has become scarcer, valves of *Cardium echinatum* and other species have largely taken the place of *Turritella*, and *Littorina* is much used instead of *Helix*. Although there are still plenty of living *Helices* to be found, it never seems to have occurred to the shell gatherers to collect and clean these. This also applies to Bundoran.

Considering the vast numbers of *Helix nemoralis* found on the Lancashire dunes, it seems at first sight strange that before Mr. Drummond's captures there should have been no previously recorded "sports," either reversed or scalariform, but the record might have been different had the attention of the Lancashire shell gatherers been drawn to them, by pecuniary motives, as has been done in the case of the peasant women of Bundoran. As to the cause of the abnormal forms, and their comparative abundance at Bundoran, it appears to me possible that it may be the result of the intrusion of a grain of sand

during the early life of the mollusk, and the consequent deviation of the whorl from its normal course of growth. Figs. 17-19 show that normal shells may attain half or more of their growth before developing scalarity. The locality is exposed and open to the Atlantic gales, and any person who has seen the clouds of storm-driven sand, which sweep over the desert area of the dunes, forming a natural sand-blast, speedily denuding even the living shells of their epidermis, will readily see that this may be a possible cause of the phenomenon.

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

311th Meeting, June 11th, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

New Members Elected.

Mr. Travis Hampson, Nuthurst, Hartopp Road, Four Oaks, Sutton Coldfield.

Mr. C. W. Vincent, 39, West Bank, Stamford Hill, London, N.

Candidate Proposed for Membership.

Mr. Raleigh S. Smallman.

Papers Read.

"Two Points in Nomenclature," by W. E. Hoyle.

"The Census of the British Land and Freshwater Mollusca," by L. E. Adams.

"*Helix rotundata* m. *sinistrorsum* Taylor, at Castleton, Derbyshire," by J. W. Jackson.

Exhibits.

By Mr. J. W. Jackson : A set of *Cyprea tigris* from Cape York, Australia, remarkable for their rich dark almost black colour, shells medium size, but very heavy, solid, and somewhat flattened ; also a living sinistral *Helix rotundata* from Castleton, Derbyshire.

By Mr. F. Taylor : Young fry of *Paludetrina taylori* ; *Azeca tridens* Romiley, Cheshire ; *Clausilia biplicata*, Barnes Bridge, Middlesex ; *Cl. rolphi*, *Helix rotundata* type and var. *alba*, with a curious intermediate form, shewing faint red stripes on a white shell ; *Buliminus obscurus* type and var. *albina* ; *Hyalinia nitidula* type and var. *helmii*, all from Bastal Wood, Kent ; some curious monstrosities of *Physa heterostrophia*, Dukinfield Canal ; *Physa acuta* from lily tanks, Kew ; an undetermined species of *Opaeas* found plentifully in Kew Gardens ; *Hyalinia alliaria* var., *Hy. pura* var. *nitidosa* from Bardsley.

By Mr. J. W. Baldwin : *Pisidium amnicum* and *Valvata piscinalis*, Ringley Canal ; and *Paludetrina jenkinsi* from Canal at Dixon Fold, near Bolton.

By Mr. J. D. Dean : An interesting series of *Helix nemoralis*, *H. hortensis*, *H. arbustorum* and var. *flavescens*, *H. rotundata*, *H. rupestris*, *H. hispida*, *H. lapicida*, *Hyalinia alliaria*, *Hy. cellaria*, *Hy. crystallina*, *Hy. nitidula*, *Azeca tridens*, *Pupa cylindracea*, *Clausilia perversa* and var. *cravenensis*, from the Malham district, also *Limnaea peregrina* (striated variety), *L. stagnalis*, *L. truncatula*, *Planorbis contortus*, *Valvata piscinalis*, *Sphaerium corneum*, and *Pisidium amnicum* from Malham Tarn ; *Ancylus fluviatilis* from Malham Cove.

A large number of locality sets and local forms of all the British *Hyalinia*, together with continental examples of critical species for comparison, were exhibited

by Messrs. W. Moss, E. Collier, B. R. Lucas, F. Taylor, J. W. Baldwin, J. W. Jackson, and J. D. Dean. Mr. R. Standen also shewed the fine series from the Society's cabinets, the "Stubbs'" and "Oldham" collections, and that of the Manchester Museum. Mr. W. Moss pointed out the general characters used in the specific separation of *Hyalinia draparnaldi* and *Hy. cellaria*, and of *Hy. glaber* and *Hy. alliaria* respectively, and an interesting discussion ensued.

312th Meeting, September 10th, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

"The Land and Freshwater Mollusca of Staffordshire," by J. R. B. Masefield ; "The Marine Mollusca of Sandsend, Yorks.," by Miss M. V. Lebour ; "The Marine Shells of Guernsey and the Lesser Channel Islands," by E. D. Marquand ; "Ostersjöns nutida sötvattensmolluskfauna" and "Beiträge zur Kenntniss des Thierlebens in Wassersammlungen von Wechselndem Salzgehalt," by E. Norden-skiöld ; "Report on Dredging and other Marine Research off the N.E. Coast of England in 1901," by Geo. S. Brady ; "The Mollusca of a Suffolk Parish," by A. Mayfield (*from the respective authors*). Also "Report on Scientific Investigations for 1901" (*from the Northumberland Sea Fisheries Committee*), and "Illustrations and Descriptions of Shells in the U.S. National Museum," by W. H. Dall (*from the Smithsonian Institution*), and the usual periodicals received in exchange.

New Member Elected.

Mr. Raleigh S. Smallman, Carlton House, Herne Hill, S.E.

Candidate Proposed for Membership.

Rev. A. E. Northey, M.A., Lisworney, Torquay.

Papers Read.

"Land and Freshwater Mollusca of Barbadoes," by L. B. Brown.

"Marine Shells of South Africa," by E. A. Smith.

"*Paludestrina jenkinsi* near Eastbourne," by A. G. Stubbs.

"Report on the Leasowe Ramble," by R. Standen.

"Report on the Miller's Dale Ramble," by J. W. Jackson.

Exhibits.

By Mr. W. Moss : The series of Barbados Shells sent by Mr. L. B. Brown to illustrate his paper. Mr. Moss also showed his own fine collection of Barbados mollusca, which is very complete, and contains long series of varietal forms.

By Mr. J. W. Baldwin : *Helix hortensis* of the form *minor-coalita* from Chatburn.

By Mr. Cairns : *Planorbis dilatatus* discovered in the collection of the late Mr. T. Rogers, and, judging from the label, evidently the original specimens taken by him, in 1869, and sent to Gwyn Jeffreys for identification. These historic specimens passed into Mr. Cairns' hands on the acquisition of Mr. Rogers' collection by Mr. H. B. Preston.

By Mr. J. W. Jackson : A series of land shells from the Darland Hills, Kent ; abnormal dwarf forms of *Mytilus edulis* from the breakwater at Leasowe, Cheshire ; *Cecilioides acicula* and other species collected during the Miller's Dale Ramble on August 9th ; an interesting series of young forms of *Viviparus contectus* ; *Hyalinia excavata* type and var. *vitrina*, from a new locality near the Roman Bridge, Marple, Cheshire ; *Limnaea bulimoides* Lea, from Wibany, Montana—these specimens were sent by Prof. W. H. Dall for comparison with the unknown *Limnaea* discovered last year in the Dukinfield Canal, and believed to be *L. bulimoides*, this, however, proves not to be correct, and the Dukinfield specimens still remain undetermined.

DESCRIPTIONS OF NEW SPECIES OF MARINE SHELLS FROM SOUTH AFRICA.

BY EDGAR A. SMITH.

(Read before the Society, September 10th, 1902).

PLATE IV.

1. *Natica kraussi*. (Pl. IV., fig. 1).

Testa globosa, perspective umbilicata, albida, zonis duabus vel tribus interruptis fuscescentibus vel rufescentibus cincta, epidermide tenui olivacea induta, striis spiralibus tenuibus sculpta, lineisque incrementi obliquis striata; anfractus quinque, celeriter accrescentes, convexi, sutura profunda fere canaliculata sejuncti, ultimus antice vix descendens; apertura semi-circularis, alba, zonis externis plus minus conspicuis; columella rectiuscula, superne callosa, incrassata; callus in umbilico mediocris, ascendens. Operculum corneum, flavescens, paucispirale, incrementi lineis striatum, ad suturam leviter carinatum.

Diam. major 16½ mm., *min.* 14, *alt.* 15.

Hab., Durban, Natal (Burnup); Mauritius (Robillard in Brit. Mus.).

The transverse colour-bands are not very conspicuous in some specimens, and are usually more or less interrupted into series of spots. The uppermost is a little below the suture, the second about the middle of the body-whorl, and the third upon the base. The spire is a little raised, and the apex stained with a brownish tint. The spiral striæ are distinct and rather deeply incised in the type, and they are visible upon and beneath the periostracum. In other examples they are finer and less conspicuous. Type in British Museum.

2. *Assiminea umlaasiana*. (Pl. IV., fig. 3).

Testa ovata, supra acuminata, solida, imperforata, pallide fuscescens, lævis, subnitens; anfractus sex convexi, sutura leviter obliqua sejuncti, ultimus haud descendens, ad peripheriam obsolete obtuse subangulatus; apertura piriformis, longit. totius ½ haud æquans; peristoma intus leviter incrassatum, margine columellari calloso, antice crassissimo, effuso. Longit. 3½ mm., *diam.* 2½.

Hab., in caves in the ocean cliff about half-a-mile south of the mouth of the Umlaas River, Natal (Burnup).

Remarkable on account of the very much thickened anterior part of the columella. With the exception of delicate oblique lines of growth the shell is smooth. Type in British Museum.

3. *Astraliium (Bolma) andersoni*. (Pl. IV., fig. 7).

Testa turbinata, turrita, imperforata, roseo-purpurea, apicem versus pallida, albo nigroque variegata; anfractus sex, supra declives, in medio angulati, ad angulum nodosi, infra ad suturam carinati, et

breviter subspinose spiraliter vel suboblique conspicue striati, ultimus ad medium biangulatus, nodulis circiter 13 instructus, infra fere planus, dilute aurantiacus, prope peripheriam roseo-purpureus, liris numerosis concentricis crenulatis instructus, in medio callo umbilicali aurantiaco levi ornatus; apertura obliqua, intus albida; columella arcuata, incrassata alba. Diam. maj. 31 mm., min. 24, alt. 27.

Hab., off Durban, from the stomach of a fish.

This species agrees with the sub-genus *Bolma* in the purplish pinkish colour and the umbilical callus. It is quite distinct from *B. modestus* Reeve, from Japan, its nearest ally, both in form and sculpture.

The colour of this shell is varied. The general tone is pinkish purple above and pale orange on the base. A closer inspection, however, reveals the presence of some brownish maculations at intervals beneath the suture, edged on the hinder side with a dark margin, behind which is a whitish line. The spire, especially towards the apex, is whitish and is variegated with black and white speckling. Named after Mr. Anderson, junr., of Durban, who is an enthusiastic collector, and has obtained many fine shells from the stomachs of fishes from deep water. The type, at present, is in his collection.

4. *Tornatina meridionalis*. (Pl. IV., fig. 2).

Testa ovato-cylindracea, alba, periostraco rufo plus minus induta; spira parva, mucronata, profunde canaliculata; anfractus normales 3-3½ supra acute carinati, ultimus cylindraceo-ovatus, lævis, nitidus, lineis incrementi tenuissimis striatus; apertura elongata, anguste piriformis, postice canaliculata; columella antice reflexa, incrassata. Longit. 5 mm., diam. 2½.

Hab., Natal.

This species may possibly become larger than the specimens now described. It does not present any striking features, but is certainly distinct from the other species quoted from South Africa. A portion of the periostracum usually remains on the spire and on the body-whorl near the reflexed columella. Type in British Museum.

5. *Turbinella triangularis*. (Pl. IV., fig. 6).

Testa triangularis, umbilicata, flavescens epidermide caduca rugose striata vel lamellata griseo-olivacea induta; spira plana, in medio concave elata, ad apicem papillosa; anfractus octo, superiores 2-3 læves, convexi; sequentes 1-2 plus minus cancellati, cæteri spiraliter striati, supra suturam coronati, lineis incrementi arcuatis striati, ultimus magnus, supra planatus et angulatus, ad angulum tuberculis circiter 9 coronatus, infra seriebus tuberculorum quinque instructus; apertura elongata, angusta, superne quadrata, intus alba; columella in medio plicis quatuor tenuibus prominentibus albis instructa, antice reflexa umbilicum semitegens. Longit. 48 mm., diam. 35; apertura 40 longa, 9 lata.

Hab., off Durban, in deep water.

This species is very distinct from all the known forms of *Turbinella*. It is remarkable on account of its triangular form, the flattened upper surface, the coronated angle, and the series of tubercles on the body-whorl, which are arranged in longitudinal and transverse rows. The periostracum is lamellated, and appears to be very liable to scale off when dry. Beneath the periostracum the surface is glossy and striated with fine lines of growth. Type to be presented to the British Museum by J. F. Quekett, Esq.

6. **Latirus alboapicata.** (Pl. IV., fig. 5).

Testa fusiformis, rufescens, ad apicem alba, infra medium anfractus ultimi zona pallida cincta; spira elongata, subturrita, ad apicem papillata; anfractus $7\frac{1}{2}$, supremi duo læves, rotundati, tertius costis longitudinalibus circiter 12 instructus, cæteri supra leviter concavi, declives, infra nodose costati, transversim spiraliter lirati, ultimus costis circiter 8 inferne evanescentibus instructus, infra medium contractus; apertura ovata, antice in canalem obliquum recurvum producta, intus rufescens; columella callo crassiusculo reflexo induta, prope labrum tuberculo parvo minuta. Longit. 28 mm., diam. 12; apertura cum canali 14 longa, 5 lata.

Hab., Durban.

The white apex which contrasts very strikingly with the rest of the shell is bluntly mammillated and large for the size of the shell. The costæ on the lower whorls are nodose and are not produced above to the suture, beneath which the whorls are a little concave. The reflexed columellar callus forms a slight umbilical fissure anteriorly. Type, at present, in Mr. Anderson's collection.

7. **Columbella (Anachis) leptalea.** (Pl. IV., fig. 4).

Testa minima, ovato-fusiformis, tenuis, sordide pellucida, serie linearum sagittæformium rufarum circa medium anfractum ornata, interdum lineis 1-2 transversis tenuibus picta; anfractus 6-7, tres superiores convexi, cæteri planiusculi, infra suturam zona pellucida plus minus conspicua marginati, aut læves aut plicati, ultimus infra medium lineis flexuosis rufis pictus, circa basim oblique sulcatus; apertura longit. totius $\frac{1}{2}$ haud æquans; labrum intus leviter incrassatum, haud denticulatum, superne macula rufo-nigra conspicua notatum, prope suturam leviter sinuatum; columella rectiuscula, callo tenui induta. Longit. 3 mm., diam. 1; apertura $1\frac{1}{3}$ longa.

Hab., Umkomaas, Natal.

At once recognisable by the peculiar style of colouration, consisting of a series of zig-zag shaped red lines upon the middle of the whorls or of thin transverse red lines, one upon the upper whorls and two on the last, and a very conspicuous darker spot upon the labrum. The

cauda of the body-whorl which is obliquely sulcated is of a somewhat reddish tint. Those specimens which are costate, and may be regarded as representing the typical form, have the spire somewhat turreted, whilst in those which are smooth this feature is less observable.

A variety of *Columbella* (*Anachis*) *minuscula* Gould¹ is very like the lineated form of this species. *C. minuscula*, however, has more numerous and finer costæ, and a denticulate labrum, upon which the characteristic brown blotch of the present species appears to be wanting. Type in British Museum.

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Irish Naturalist, vol. 11, nos. 6-9, June-Sept., 1902.

"Land and Freshwater Shells from Co. Clare," by P. H. GRIERSON. "*Vertigo edentula* on Furze Bushes," by H. L. ORR. "Some new stations for Mollusca" [*Odostomia plicata*, *Eulimella nitidissima*, *Otina otis*, Sheep Haven; *Hydrobia ventrosa*, Clew Bay; *Sphenia binghami*, Youghal Strand]; "Longford Land and Freshwater Mollusca" [new records for the county], by R. WELCH. "Abnormal Land Mollusca from Bundoran" [reversed and scalariform *Helix nemoralis*], by R. WELCH.

The Naturalist, nos. 545-548, June-Sept., 1902.

"Terrestrial Mollusca of Doncaster" [42 spp. and varr.], by H. H. CORBETT. "New locality for *Clausilia rolfii* in Lincolnshire" [Kenwick Bar], by C. S. CARTER. "Lincolnshire Non-Marine Mollusca" [149 spp. with bibliography], by H. WALLIS KEW. "*Pyramidula rupestris* near Grantham," by C. S. CARTER. "*Hyalinia lucida* near Alford, North Lincolnshire," by C. S. CARTER. "*Paludetrina jenkinsi* in Lincolnshire," by H. WALLIS KEW. "*Pupa secale* in South Lincolnshire," by C. S. CARTER. "*Pisidium henslowanum* and Band-Formula 12045 of *Helix nemoralis* near Brigg," by C. S. CARTER. "*Pisidium henslowanum* in Lincolnshire," by H. WALLIS KEW. "Mollusca from Grantham District" [34 spp.], by C. S. CARTER. "*Pupa ringens* at Flamborough Head," by W. C. HEY. "*Valvata cristata* in Upper Airedale, Yorkshire," by F. RHODES. "*Cyclostoma* at Oxcombe, Lincolnshire, N.," by C. S. CARTER. "*Pisidium subtruncatum* near Louth, Lincolnshire, N.," by C. S. CARTER. "*Agriolimax agrestis* devouring Earthworms," by C. S. CARTER. "Yorkshire Naturalists at North Grimston" [list of 35 spp. collected], by T. SHEPPARD. "Half-a-Day's Ramble at Mablethorpe" [list of 31 marine spp.], by ARTHUR SMITH.

The Naturalists' Journal, vol. 11, no. 120, June, 1902.

"How Slugs Descend from a Height," by J. W. FAWCETT.

The Nautilus, vol. 16, nos. 2-5, June-Sept., 1902.

"A new species of *Lampsilis*" [*L. blatchleyi*, Indiana, figd.], by L. E. DANIELS. "New England Marine Collecting" [remarks on rarity and frequency], by Rev. H. W. WINKLEY. "Notes on the Giant Limas" [distinctive characters], by WM. H. DALL. "The Shell-Bearing Mollusca of Rhode Island" [3 additions to previous list], by H. F. CARPENTER. "A new genus of Eocene Eulimidæ" [*Ptereulima*, type *P. elegans*, St. Maurice, La.], by T. L. CASEY. "Three new species of *Chromodoris*" [*C. universitatis*, *C. porteræ*, *C. mcjarlandi*, California], by

¹ "Otia Conch.," p. 131.

T. D. A. COCKERELL. "New Land Shells of the Japanese Empire" [*Chloritis bracteatus*, *Pupisoma japonicum*,] by H. A. PILSBRY.

"Cruising and Collecting off the Coast of Lower California," by F. BAKER. "A new Naiad from New Zealand" [*Diplodon websteri*, New Zealand], by C. T. SIMPSON. "New American Land Shells" [*Polygyra alabamensis*, Alabama, *P. texasensis*, *Sonorella granulatissima*, Texas], by H. A. PILSBRY.

"Collecting Unionidæ in Texas and Louisiana," by L. S. FRIERSON. "List of Shells on San Martin Island, Lower California," by F. BAKER. "New species of Pacific Coast Shells" [*Trivia atomaria*, *T. panamensis*, *Erato oligostata*, Panama Bay, *Cyclinellaingleyi*, Gulf of California], by WM. H. DALL. "New Land Mollusks of the Japanese Empire" [*Eulota minima*, *E. hachijoensis*, *Hirasea major*, *H. profundispira*, and 4 nn. varr.], by H. A. PILSBRY. "Two new *Bulimini* from Central Asia" [*B. larvatus*, *B. albocostatus*], by C. F. ANCEY.

"Notes on Tasmanian and West Indian Conchology" [Reprint from *Proc. Roy. Soc. Tasmania*, 1902], by C. HEDLEY. "Fossil Land Shells of the Old Forest Bed of the Ohio River" [30 spp., with notes on occurrence], by A. C. BILLUPS. "A New Helix [*Epiphragmophora exarata* var. *rubicunda*], from California," by J. ROWELL. "A New Floridan *Helicina* [*H. tantilla*]," by H. A. PILSBRY. "New Land Mollusks from the Japanese Empire" [*Alycæus vinctus*, *Macrochlamys semisericata*, *Zonitoides subarbores*, *Microcystina circumdata*, *Kaliella hachijoensis*, *K. pallida*, *Sitala latissima*, *Bulininus hiraseanus*, *Carychium hachijoensis*, *Tornatellina biplicata*, nn. spp.], by H. A. PILSBRY. "List of Land Shells collected in the Sacramento Mountains, New Mexico" [15 spp., none new], by E. G. VANATTA.

La Feuille des Jeunes Naturalistes, nos. 380-383, June-Sept., 1902.

"Les Mollusques de la Tarentaise (*fin*)," [59 spp., 11 peculiar, with notes on fauna], by G. COUTAGNE. "Faunule Malacologique de Saint-Raphael (Var)" [541 spp. testaceous mollusca], by ED. CLAUDON.

Journal de Conchyliologie, vol. 50, no. 1, Aug., 1902.

"Liste des Mollusques testacés de la baie de Tanger" [*Trochocochlea blainvillei*, n.sp., figd.], by P. PALLARY. "Descriptions d'une nouvelle espèce de *Bulinulus*" [*B. bonneti*, Bolivia], by C. F. ANCEY. "Sur l'exagération du dimorphisme sexuel chez un Gastropode" [marked difference of size in *Lacuna pallidula*], by P. PEL-SENEER.

The Journal of Malacology, vol. 9, no. 2, June 30th, 1902.

"Notes on the British species of *Buccinum*, *Fusus*, etc." [*Fusus gracilis* var. *glaber* Verk., new to Britain; *F. propinquus* var. *levis* n., *F. consimilis* n.sp.], by J. T. MARSHALL. "A Classified List of the Helicoid Land Shells of Asia" [lists given for different localities], by G. K. GUDE. "Description of a new species of *Chloritis* from New Guinea" [*C. (Sulcobasis) prestoni*, figd.], by G. K. GUDE. "On a Collection of Land and Freshwater Shells from Kelantan, Malay Peninsula" [*Boysidia kelantanense*, *Alycæus kelantanense*], by E. R. SYKES. "Is *Amalia carinata* Risso a British slug?" [appeal for material], by W. E. COLLINGE. "On a Malformed Variety of *Limnaea pereger*" [shell with gap in lip], by H. OVERTON. "Description of a new species of *Separatista* from New Zealand" [*S. venhami*], by H. SUTER.

Proceedings of the Academy of Natural Sciences of Philadelphia, vol. 53, pt. 3, Sept.-Dec., 1901.

"New Land Mollusks of the Japanese Empire" [numerous forms briefly described], by H. A. PILSBRY. "*Fasciolaria gigantea* subsp. *reevii*" [exhibition of specimen], by H. A. PILSBRY. "Descriptions of New Helicoid Land Shells from Japan" [*Chloritis pumila*, *Eulota mimuloides*], by G. K. GUDE. "Additions to the Japanese Land Snail Fauna" [groups of *Hemiphaedusa* characterised]; "Catalogue

of Clausiliidae of the Japanese Empire" [93 spp., 35 varr., 11 insufficiently described], by H. A. PILSBRY.

Report of the Manchester Museum, Owens College, for 1901-1902.

Records valuable donations of shells from Mr. R. D. Darbishire and the Rev. A. Dixon.

Memoirs and Proceedings of the Manchester Literary and Philosophical Society, vol. 46, pt. 1.

"The Luminous Organs of *Pterygioteuthis margaritifera*, a Mediterranean Cephalopod," by W. E. HOYLE.

Northumberland Sea Fisheries Committee Report for the year 1901, Oct. 17th, 1901.

"The Marine Mollusca of Northumberland" [36 additions to previous list], by MARIE V. LEBOUR.

Records of the Australian Museum, vol. 4, no. 6.

"Report for the year 1901: Conchology," by C. HEDLEY [collection now includes over 4,000 spp. of Australasian shells and 850 spp. of foreign shells].

Proceedings of the Royal Society of Victoria, vol. 14, pt. 2, April, 1902.

"Catalogue of the Marine Land Shells of Victoria, pt. 5" [Cerithiidae to Trochidae], by G. B. PRITCHARD and J. H. GATLIFF. "On some new species of Victorian Mollusca, no. 5" [*Mangilia* (?) *incerta*, *Terebra inconspicua*, *Leptothyra arenacea*, *Calliostoma hedleyi*, *Haliotis granti*, figd.], by G. B. PRITCHARD and J. H. GATLIFF.

"Illustrations and Descriptions of New, Unfigured or Imperfectly-Known Shells, chiefly American, in the U.S. National Museum," by W. H. DALL (*Proc. U.S. Nat. Mus.*, no. 1264, vol. 24, pp. 499-566, pls. 27-40).

"The Marine Shells of Guernsey and the Lesser Channel Islands," by E. D. MARQUAND (*Trans. Guernsey Soc. Nat. Sci.*, 1901).

"Report on Dredging and other Marine Research off the North-East Coast of England in 1901," by G. S. BRADY (*Nat. Hist. Trans. Northumberland, Durham, and Newcastle-upon-Tyne*, vol. 14, pt. 1). List of Mollusca, by MARIE V. LEBOUR.

"Beiträge zur Kenntniss des Thierlebens in Wassersammlungen von wechselndem Salzgehalt," by E. NORDENSKIÖLD (*Öfversigt K. Vet.-Akad. Förhandl.*, 1900, no. 9) [Remarks and generalisations on the effect of salinity on animal life].

"Ostersjöns nutida sötvattensmolluskfauna," by E. NORDENSKIÖLD [general remarks with figures of numerous varieties] (*Bihang K. Svenska Vet.-Akad. Handl.*, vol. 26, pt. 4, no. 11).

Trans. Norfolk and Norwich Naturalists' Society, vol. 7.

"The Mollusca of a Suffolk Parish," by ARTHUR MAYFIELD.

Note on the Drying of Chitons.—Having found a Chiton and detached it from its rock or stone, I then and there cut out the animal with a sharp knife before it has time to curl up. Upon arriving at home, after a supplementary cleaning, I strap the shell down on a piece of wood or at the bottom of an empty cigar box, with the aid of pins and a strip of paper, until dry and set, as one does the wings of a butterfly. This method is very simple and effective, and no doubt not original, but the curled-up form in which I have received several species of Chitons from other conchologists induces me to mention it as likely to be of use to some members. I have also found the strip of paper and pins useful in closing small and delicate bivalves which would not admit of being tied up with thread.—JOHN S. EDWARDS (*Read before the Society, Feb. 12, 1902*).

WEST AMERICAN CYPRÆIDÆ.

BY FRED L. BUTTON.

With a PREFATORY NOTE by L. ST. G. BYNE, M.Sc.

(Read before the Society, May 14, 1902).

PREFATORY NOTE.

AT my suggestion Mr. F. L. Button, of Oakland, California, has written a list of the Cypræidæ inhabiting the western shores of North and South America. It has been made as complete as possible and as no such work is in existence it should prove most useful to British cypræologists. Although Mr. Button has had great experience of West American *Cyprææ* and possesses extensive suites of many species, yet he has refrained from describing any new varieties. I have noted this fact with much pleasure and satisfaction, and hope that his example may be imitated by others in the future. This is a convenient place to express the indebtedness of many of the Society's members to the author for his generous help in supplying many of the species enumerated.

L. ST. G. B.

The following is a list of the Cypræidæ found along the Western or Pacific Coasts of North and South America, so far as now known. The maximum lengths are indicated in millimetres and represent, for the most part, specimens in my personal collection. The geographical ranges are compiled from all sources obtainable—largely from the published works and papers of Dr. P. P. Carpenter, C. B. Adams, Dr. R. E. C. Stearns of the U.S. National Museum, of Dr. J. G. Cooper of the California Academy of Sciences, from the original descriptions, and from authentic specimens at hand. I have also made use of the monographs of Messrs. Sowerby, Reeve, Kiener and Roberts,¹ and of Mr. J. Cosmo Melvill's valuable paper.

1.—**Cypræa albuginosa** Mawe. 28 mm. Lower California and Gulf to Galapagos Islands, Ecuador.

2.—**C. arabicula** Lam. 38 mm. Lower California to Peru.

3.—**C. exanthema** Linn. Type form. 140 mm. Gulf of California.

The Pacific or type-form, well figured by Kiener (pl. 4, fig. 1) and by Reeve (Sp. 16), although the habitat given by both is erroneous, is found only along the Gulf of California (Western Mexico), has large spots, more or less ocellated, a thin semi-pellucid texture, and prominent apex. The Sowerby figures (nos. 182-4 and 330), represent an extreme specimen, both as to ocellation and bluish colouring of the

¹ Tryon, "Man. Conch.," vol. 7, 1885.

spots, as these characters are usually much less marked and are sometimes entirely lacking. (See note on *C. cervus*, *postea*).

4.—**C. exanthema** var. **cervinetta** Kiener. 35 to 92 mm. Panama region, south to Ecuador and Galapagos Islands.

This form has the small, frequent spots of *C. cervus*, but is usually greyish on the sides of the base, and shows the four cross-bands well marked. It is peculiar to the Panama region in Pacific waters, and varies in colouring between the Kiener figure (pl. 6, fig. 1) and that of Sowerby (no. 181). The shape is flatter than the type and more tapering at the ends.

5.—**C. isabella-mexicana** Stearns (*Proc. U.S. Nat. Mus.*, 1893, p. 348). 41 mm. Clipperton Island and Tres Marias Islands (off W. Mexican coast). Figured by Sowerby (fig. 18, not fig. 258) as *C. controversa* Gray, an unpublished species. This very beautiful shell, an extreme form of the *Isabella* group, is also said, on doubtful authority, to have been found off the Mexican mainland. I have had it only from Clipperton Island.

6.—**C. nigropunctata** Gray. 35 mm. Ecuador and Galapagos Islands.

7.—**C. punctulata** Gray. 32 mm. Gulf of California to Panama.

8.—**C. sowerbyi** Kiener. 51 mm. Lower California to Peru.

9.—**C. spadicea** Swin. 53 mm. Southern California.

10.—**Pustularia pustulata** Lam. 23 mm. Gulf of California to Panama.

11.—**Trivia californica** Gray. 12 mm. Central California to Gulf of California.

12.—**T. fusca** Gray. 10 mm.? Galapagos Islands (to Gulf of California?).

There has evidently been some confusion as to this species among the monographers. The type from Galapagos Islands was described as "dark-brown, sub-globular, with a pale dorsal streak, ribs few and short,"¹ and it is so figured by Reeve (no. 134, from the Gaskoin specimens); while it is figured in the Sowerby monograph as a pink, elongated shell with delicate ribs, although described as "smoky-brown throughout" (no. 72). Dr. Carpenter notes that while the specimens of *T. fusca* and also of *T. rubescens* from the Cuming collection seem to be only extreme varieties of *T. sanguinea*, those in the Gaskoin collection appear to be distinct.² The observations of Dr. Carpenter and of Mr. Sowerby (note to no. 175) relating to the close affinity of *T. fusca* to *T. sanguinea*, appear to be based upon comparison of specimens all from the West American mainland; and specimens

¹ Gray, "Descr. Cat. Cyp.," p. 15.

² "Catal. Mazatlan Shells," p. 378, note.

identified for me by the present Mr. Sowerby as *T. fusca* are clearly, in my opinion, only forms of *T. sanguinea*. From the Galapagos Islands I possess reddish, delicate elongate shells, corresponding well to the Sowerby figure, but without dorsal suture or streak, and also dark globose specimens much like the Reeve figure; but I take these last to be immature *T. galapagensis*. (See note on no. 21 *postea*).

13.—**T. galapagensis** Melv.¹ 8 mm. Galapagos Islands. A jet black shell, sent by me. Very rare.

This species proves to be ribbed throughout when perfect, instead of smooth on top, as described.

14.—**T. maugeri** Gray. 20 mm. Galapagos Islands. Very rare. Similar to *T. pacifica* and *T. suffusa*, but very large. I know of but two examples here—one fine, one badly bleached.

15.—**T. pacifica** Gray. 10 mm. Gulf of California to Galapagos Islands.

16.—**T. pulla** Gaskoin. 7 mm. Gulf of California to Galapagos Islands.

17.—**T. radians** Lam. 22 mm. Southern California to Galapagos Islands.

18.—**T. rubescens** Gray. 8 mm.? Galapagos Islands, Panama (?) and Gulf of California (?) The type from Galapagos Islands was described originally as "pale reddish-brown, thin, ribs slender and continuous across the dorsal line," and "very like small spotless specimens of *T. pediculus*, but darker coloured and having the outer lip only one-half of the breadth in that species."² Reeve remarks this to be "rather a solid shell than otherwise" (no. 141), and Sowerby describes it as rose-pink, allied to *T. europæa*, resembling *T. candidula* in form, with ribs acute and few in number (no. 181 and note to no. 183). A specimen of *Trivia*, recently received by me from the type locality of *T. rubescens*, has the form of *T. candidula* and is much like *T. rubinicolor*, but does not answer to the description of *T. rubescens*. (See note on no. 21 *postea*).

19.—**T. sanguinea** Gray. 14 mm. Gulf of California (not Cal.) to Peru (?)

The characteristic reddish colouring on the back is often lacking. Small, bleached, reddish-brown specimens have, I think, been sometimes sent out in times past, possibly even by myself, as *T. fusca* or *T. rubescens*.

20.—**T. solandri** Gray. 19 mm. Southern California to Panama.

21.—**Trivia** (n. sp.).³ 10 mm. A whitish species, similar to *T.*

¹ *Ann. Mag. Nat. Hist.* (7) vol. 6, p. 208, Aug., 1900.

² *Proc. Zool. Soc.*, 1832, p. 185.

³ This species is about to be described by my young friend, Mr. Raymond, under the name *T. ritleri*; it is almost identical with some specimens of *T. europæa*, but pure white. [Note added Sept. 20, 1902.—F.L.B.]

europæa, dredged in Southern California and not yet described.

22.—**T. atomaria** Dall.¹ 3.2 mm.

23.—**T. panamensis** Dall.¹ 4.2 mm. Panama.

All these species of *Trivia* seem to be well marked and free from doubt, except *T. fusca* and *T. rubescens*, as to both of which much uncertainty has existed, both as to identity and habitat. (See nos. 12 and 18 *antea*, and also the papers of Dr. Carpenter.²) The recent receipt of various *Trivia* direct from the Galapagos Islands, the type locality of both species, has failed to clear up these doubts—at least to my mind.

DOUBTFUL AND ERRONEOUS SPECIES.

Cypræa cervus Linn.—Dr. Stearns says this is “undoubtedly an East Coast (Gulf of Mexico) form, and may be regarded as a variety of *C. exanthema*”; and that he has “never met with the *cervus* form from the West (Pacific) side.”³ My less extensive information and study leads me to the same opinion. This form is well figured in the Sowerby monograph (nos. 89 and 90), and is also figured by Roberts⁴; and as *C. cervina* by Kiener (pl. 2, fig. 1; pl. 3, fig. 1). The localities given for this form are, however, all erroneous except that of Kiener (“Antilles.”) I cannot place the form figured by Reeve (fig. 6b) which has the wide anterior beaks of *C. cervus* together with a colouring more similar to *C. exanthema*. A small form from Florida is more globose and is almost identical in form with *C. pantherina* as figured by Kiener (pl. 21, sp. 1).

I know of no specimens of this group (*cervus*—*exanthema*) coming from the Pacific Islands (Rve.), Senegal (Kiener), East Indies (Melvill), or Polynesian Islands (Carpenter, Mazatlan Moll.). Specimens reported from these localities were doubtless taken there by whalers or trading vessels after touching at American ports.

Trivia acutidentata Gask.⁵ Ecuador. Described from a single worn specimen, which was broken before the description was published (1835). No other specimens known.

T. candidula Gask.—This species mentioned as from “Mexico” (Melvill) is not known to me as from the western coast of that country or of America elsewhere. (See no. 18 *antea*).

T. costis-punctata Gask.—(Sowerby, no. 148; Melvill, “? California”). This shell, which appears to be closely allied to *T. radians*, is unknown to me.

¹ *Nautilus*, vol. 16, p 43, Aug., 1902. [Note added Sept. 20, 1902.—F.L.B.]

² *Rep. Brit. Assoc. Adv. Sci.*, 1856, pp. 159-368; “Catal. Mazatlan Shells,” p. 378.

³ *Proc. U.S. Nat. Mus.*, vol. 16, p. 395, 1893.

⁴ Tryon, “Man. Conch.,” vol. 7, pl. 2, nos. 11 and 12.

⁵ *Proc. Zool. Soc.*, 1835, p. 201.

T. depauperata Sowb. Habitat unknown, but probably from Western North America, as it appears to be closely allied to *T. californica*. "Probably described from a worn specimen of *T. californica*" (Roberts). Melvill considers this a good species. I have seen no specimen which corresponds to Mr. Sowerby's figure or description.

T. suffusa Gray.—A West Indian species erroneously credited to the Galapagos Islands,¹ doubtless on the strength of specimens of *T. pacifica*, which is somewhat similar.

T. subrostrata Gray. This is a West India species, similar to and smaller than *T. pulla*, but not found on the Pacific coasts.

It is hoped that these few notes, the result of my study, will be of value to those interested in this genus. That I may have erred in some of my conclusions as here stated is not improbable, as comparison with type specimens has not been possible in all cases. I shall be glad, however, to know of any errors and to have the corrections given equal publicity.

OAKLAND, CALIFORNIA, April, 1902.

Report on the Leasowe Ramble, July 12th, 1902.—On arriving at Leasowe station the party proceeded in the direction of the shore, towards Moreton, picking up from the ditches and hedgerows specimens of *Helix nemoralis*, *H. hispida*, and its variety *concinna*, *Hyalinia alliaria*, *Hy. pura*, *Hy. nitidula*, *Hy. crystallina*, and *Zua lubrica*. The species of aquatic mollusca were limited to *Limnæa peregrina* var. *maritima*, *L. palustris*, *L. truncatula*, *Bythinia tentaculata*, *Physa hypnorum*, and *Planorbis spirorbis*, all abundant. A pretty form of *Succinea putris* was common on iris leaves and rushes. Although a considerable distance from the sea, the ditches must contain brackish water, for a prawn (*Palaemonetes varians*) about 1.5 in. in length occurred plentifully, and it was a somewhat novel experience to bring up an assortment of familiar freshwater molluscs, intermingled with these marine crustaceans. On reaching the breakwater, we vainly searched for *Helix acuta* in its well-known locality. Those of us who were acquainted with the marvellous way in which this mollusc can, in dry weather, obliterate itself, were not greatly surprised at its absence. *Helix caperata* and *Pupa marginata* were not uncommon underneath the big stones scattered along the landward base of the breakwater. At Meols there is a large colony of *Helix aspersa*, which is evidently being slowly extirpated by thrushes, as many shells lay scattered about the sand-hills, all exhibiting the characteristic fracture inflicted by this bird. The state of the tide prevented our getting to the colony of *Pholas candida*, which burrows in the peat masses of the ancient submerged forest visible at low-water mark. Only the common littoral marine shells were found on the shore, but some small, curiously stunted and deformed *Mytilus edulis*, with thick and eroded shells, taken from crevices of the breakwater, were a notable contrast to the beautifully-marked and fragile shells of the same species from the River Mersey, shewn at a recent meeting of the Society (*antea* p. 215).—R. STANDEN (*Read before the Society*, Sept. 10th, 1902).

1 Sowerby, "Mon. Cyp.," Index to plate 34; Reeve, "Cypræa," no. 142.

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- 1889. Bergh, Prof. Dr. Rudolph, Vestregade, Copenhagen.
- 1889. Binney, Wm. G., 222, E. Union St., Burlington, New Jersey, U.S.A.
- 1889. Cossmann, Maurice, Ingénieur-chef des services techniques du chemin de fer
du nord, 95, Rue de Maubeuge, Paris.
- 1897. Dall, Wm. Heale, Smithsonian Institution, Washington, U.S.A.
- 1878. Kobelt, Dr. Wilhelm, Schwanheim, Frankfurt-am-Main.
- 1886. Martens, Dr. Eduard von, C.M.Z.S., Paulstrasse, Berlin, N. W.
- O Nelson, William, Gandy Row, Crossgates, Leeds.
- 1889. Philippi, Dr. R. A., Director del Museo Nacional, Santiago, Chile.
- 1889. Sars, Prof. G. O., Universitet, Christiania, Norway.
- 1889. Simroth, Dr. Heinrich Rudolph, Fichtestrasse 15, I., Leipzig.

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- 1885. Adams, Lionel Ernest, B.A., 68, Wolverhampton Road, Stafford.
- 1899. Appleton, Thos. Alf., M.R.C.S., 46, Britannia Rd., Fulham, London, S.W.
- 1895. Arnold, Bernard, F.L.S., Milton Lodge, Gravesend, Kent.

1886. Baillie, William, Brora, near Golspie, Sutherlandshire.
 1897. Baldwin, D. D., M.A., Hamakuapoko, Maui, Hawaiian Islands.
 1899. Baldwin, Joseph W., Darwen Road, Dunscar, near Bolton, Lancs.
 1895. Barker, Reginald Hawksworth, Grosvenor Bank, Scarborough.
 1886. Barnacle. Rev. H. Glanville, M.A., F.R.A.S., St. John's College, Grimsargh, Preston, Lancs.
 1897. Barrett, Chas. Golding, F.E.S., Tremont, Peckham Rye, London, S.E.
 1901. Beeston, Harry, Hawkestone, Havant, Hants.
 1886. Bendall, Wilfrid, 77, Baker Street, Portman Square, London, W.
 1901. Bentley, R. H., 33, Church Crescent, Muswell Hill, London, N.
 1901. Birley, Miss Caroline, 14, Brunswick Gardens, Kensington, London, W.
 1897. Blackburn, Rev. Ed. Percy, 31, New Road, Driffield, Yorks.
 1897. Blackmore, Jas. Chanter, F.G.S., Falkirk, Chatley Road, Clifton, Bristol.
 1899. Blackshaw, James C., 158, Penn Road, Wolverhampton.
 1899. Bladen, W. Wells, Stone, Staffordshire.
 1897. Blake, Wm. Charles, 2, Acacia Villas, Ross, Herefordshire.
 1895. Bles, Edward J., B.Sc., Zoological Department, University, Glasgow.
 1897. Bliss, Joseph, Boar Bank Hall, Grange-over-Sands, Lancashire.
 1899. Blundell, Mrs. Jessie M., Argyll House, Cirencester.
 1897. Bolton, Herbert, F.R.S.E., Museum, Bristol.
 1895. Booth, George Albert, F.E.S., Fern Hill, Grange-over-Sands, Lancs.
 1884. Bostock, Edwin D., Holly House, Stone, Staffordshire.
 1897. *L* Boycott, Arthur Edwin, The Grange, Hereford,
 1896. Brass, John George, The Grove, Barnard Castle, Durham.
 1879. *Brazier, John, F.L.S., C.M.Z.S., Curaçoa House, 82, Windmill Street, Sydney, N.S.W.
 1893. Brierley, Mrs. H. G., Glen View, Gledholt, Huddersfield.
 1900 *L* Broadbent, Dr. G. H., 8, Ardwick Green, Manchester.
 1899. Brooksbank, Hugh, M.B., College Road, Windermere.
 1901. Brown, W. D., Woodlands, Parbold, nr. Southport.
 1901. Brown, Lewis B., P.O. Box 148, Bridgetown, Barbados, W. Indies.
 1901. Browne, A. J. Jukes, F.G.S., Etruria, Kent's Road, Torquay.
 1897. *L* Bullen, Rev. Robert Ashington, B.A., F.L.S., etc., Pyrford Vicarage, Woking, Surrey.
 1896. Burgess, Wm. Valentine, Davenham, Wythenshawe Road, Northenden, Manchester.
 1897. Burnup, Henry Clifden, Jesmond, Pietermaritzburg, Natal.
 1901. Bury, Miss E. P. F., 77, Elm Park Mansions, Park Walk, Chelsea, London, S.W.
 1879. Butterell, J. Darker, Manor House, Wansford, Hull.
 1902. Button, Fred. L., 969, Broadway, Oakland, California.
 1888. Byne, Loftus St. George, M.Sc., c/o W. G. Marshall, Esq., Morton Manor, near Taunton.
 1891. Cairns, Robert, 159, Queen Street, Hurst, Ashton-under-Lyne, Lancs.
 1893. Carphin, Mrs. Janet, 7, Lockerbie Cottages, Liberton, Edinburgh.
 1901. Carter, Chas. S., 172, Eastgate, Louth, Lincs.
 1878. Cash, William, F.G.S., F.R.M.S., 35, Commercial Street, Halifax
 1901. Chadwick, Wm. H., Harrogate, Nether Street, North Finchley, London N.
 1892. Champ, Hy., c/o S. & J. Watts & Co., Portland Street, Manchester.
 1895. Chaster, George Wm., M.R.C.S., 42, Talbot Street, Southport, Lancs.
 1887. Chaytor, R. C., Scafton Lodge, Middleham, Bedale, Yorks.
 1889. Christy, Robert Miller, F.L.S., Pryors, Broomfield, nr. Chelmsford, Essex.
 1886. Coates, Henry, F.R.S.E., Pitcullen House, Perth,

1880. Collier, Edwd., Glen Esk, Whalley Range, Manchester.
 1898. Collinge, Walter Ed., F.Z.S., University, Birmingham.
 1897. Cook, Rev. Thomas, Whinwood, Westcliff Grove, Harrogate.
 1901. Cooke, Rev. Alfred H., M.A., Aldenham School, Elstree, Herts.
 1892. Cooper, James Eddowes, 68, North Hill, Highgate, London, N.
 1895. Corker, Jas. S., 59, Darncombe Street, Moss Side, Manchester.
 1901. Cox, Jas. C., M.D., F.L.S., Sydney, N. S. Wales.
 1899. Crampton, C. B., M.B., Geological Survey Offices, Sheriff Court Buildings, Edinburgh.
 1890. Crawford, James, c/o J. C. Kemsley and Co., Port Elizabeth, Cape Colony.
 1886. Crick, Walter D., Nine Springs, Cliftonville, Northampton.
 1888. Crouch, Walter, F.Z.S., Grafton House, Wellesley Road, Wanstead, Essex.
 1899. Crowther, J. E., Portland Street, Elland, Yorks.
1886. DaCosta, Solomon I., 9, Gloucester Square, London, W.
 1897. Dacie, John Charles, 30, Montserrat Road, Putney, London, S.W.
 1893. Daniel, A. T., M.A., Richmond Terrace, Shelton, Stoke-on-Trent.
 1886. Darbishire, Robert D., Victoria Park, Manchester.
 1899. Darnbrough, Frederick, Croft Villa, Eaglescliffe, Yarm-on-Tees.
 1897. Dautenberg, Ph., 213, Rue de l' Université, Paris.
 1898. Dean, John D., 2, Clarendon Road, Whalley Range, Manchester.
 1892. Dixon, James Bassett, Ribblesdale House, Preston, Lancs.
 1901. Drummond, Robt., 20, Upper Talbot Street, Blackpool.
 1901. Dyson, W. O., 41, Whiteley Street, Oldham.
1892. Eccles, John Christopher, 20, Winckley Square, Preston, Lancs.
 1895. Edwards, J. Sumner, Oak Lodge, Harehills Avenue, Leeds.
 1895. Edwards, Thos., Cliftonville House, Equity Rd., Narborough Rd, Leicester.
 1901. Edwards, W. H., Hastings Museum, Victoria Institute, Worcester.
 1891. Elgar, Hubert, 3, St. Michael's Terrace, Fant Road, Maidstone, Kent.
 1884. Elliot, Edward J., High Street, Stroud, Gloucestershire.
 1901. Ensor, A. R., 60, Lumley Road, Skegness, Lincolnshire.
 1888. Evans, Mrs. A., sen., Brimscombe Court, Thrupp, near Stroud, Gloucestershire.
 1894. Evans, Wm., F.R.S.E., 38, Morningside Park, Edinburgh.
 1886. Eyre, Rev. W. L. W., M.A., Swarraton Rectory, Alresford, Hants.
1891. Farrer, Captain Wm. James, Chapel House, Bassenthwaite, Keswick.
 1897. *L* Farquhar, John, 3, Rose Terrace, African Str., Grahamstown, Cape Colony.
 1897. Fielding, Clement, M.P.S., Clover Hill, Halifax, Yorks.
 1890. Fierke, Frederick Wm., 73, Redbourne Street, Hull.
 1884. *L* Fitzgerald, Rev. H. Purefoy, Wellington College, Berks.
 1886. Fitzgerald, Mrs. J., Kapai, Maidstone Road, Headcorn, Kent.
 1898. Fitzsimons, J. B., M.D., 14, Owen Street, Hereford.
 1892. Fulton, Hugh, 15, Station Parade, Kew Gardens, near London.
 1895. Gamble, Frederick Wm., D.Sc.(Vict.), Owens College, Manchester.
 1889. Gaskell, Roger, M.A., 5, The Grove, Highgate, London, N.
 1887. Gerland, Conrad, M.Sc., Ph.D., F.C.S., Meadow Bank, Accrington
 1898. Glover, Miss Maria, 124, Manchester Road, Southport, Lancs.
 1886. *L* Godlee, Theo., Whips Cross, Walthamstow, Essex.
 1897. Godwin-Austen, H. H., Lt.-Col., F.R.S., etc., Nore, Godalming, Surrey.
 1902. Gower, Harry D., 55, Bensar Road, Croydon.
 1886. Greene, Rev. Carleton, M.A., Gt. Barford Vicarage, St. Neots. Huntingdon.

1901. Gubbins, Mrs., Westwood Ho!, N. Devon.
 1890. Gude, G. K., F.Z.S., 114, Adelaide Road, Hampstead, London, N.W.
 1886. Gwatkin, Rev. Prof. H. M., LL.D., M.A., 8, Srope Terrace, Cambridge.
1897. Hall, Thos. Bird, Larch Wood, Rock Ferry, Cheshire.
 1902. Hall, W. J., Manchester Museum, Owens College, Manchester.
 1902. Hamp, W., Trairs, Nuthurst, Hartopp Road, Four Oaks, Sutton Coldfield.
 1895. Hann, Rev. Adam, 100, Union Street, Willenhall, Staffordshire.
 1895. Hardy, John Ray, Manchester Museum, Owens College, Manchester.
 1895. Hardy, John, 11, Stockton Road, Chorlton-cum-Hardy, near Manchester.
 1887. Hargreaves, J. A., 3, Ramshill Road, Scarborough, Yorks.
 1897. Harrison, Miss G. M., 14, Queen's Road, Southport, Lancs.
 1889. Hartley, Alfred, 19, Thorpe Garth, Idle, near Bradford, Yorks.
 1887. Harvard, T. Mawson, 23, Northbrook Road, Lee, London, S.E.
 1891. Hawell, Rev. John, M.A., Vicarage, Ingleby Greenhow, Middlesborough.
 1887. Heathcote, Wm. Henry, F.L.S., 19a, Fishergate, Preston, Lancs.
 1896. Herdman, Prof. W. A., D.Sc., F.R.S., University College, Liverpool.
 1887. Hey, Thomas, 8, Bloomfield Street, Derby.
 1895. Hibbert, Charles R. C., Riccard's Down, Abbotsham, Bideford, Devon.
 1895. Hickson, Prof. Sydney J., D.Sc., M.A., F.R.S., Owens College, Manchester.
1893. Hill, John, Little Eaton, near Derby.
 1886. *L* Hillman, Thomas Stanton, Eastgate Street, Lewes, Sussex.
 1886. Holmes, W. J. O., F.L.S., Strumpshaw Hall, Norwich.
 1891. Horsley, Rev. J. W., St. Peter's Rectory, Walworth, London, S.E.
 1884. Howell, George O., 210, Eglinton Road, Plumstead, Kent.
 1892. Howorth, Sir Henry Hoyle, K.C.I.E., M.P., F.R.S., etc., 30, Collingham Gardens, London, S.W.
 1886. Hoyle, W. E., M.A., Director of the Manchester Museum, Owens College, Manchester.
 1895. Hudson, Rev. Hy. A., 445, Stretford Road, Manchester.
1901. Jackson, J. W., 18, Bedford Avenue, Manley Park, Manchester.
 1886. James, John H., A.R.I. Cornwall, 3, Truro Veau Terrace, Truro.
 1891. Jenner, James Herbert Augustus, F.E.S., 209, School Hill, Lewes, Sussex.
 1901. Johnson, W. H., 97, Rumford Street, Chorlton-on-Medlock, Manchester.
 1894. Jones, Kenneth Hurlstone, M.B., R.N., H.M.S. "Waterwitch," China Station, Shanghai.
 1889. Jordan, H. K., F.G.S., The Knoll, Clytha Park, Newport, Monmouthshire.
1897. Kendig, Rev. Amos B., D.D., 86, Vernon Str., Brookline, Mass., U.S.A.
 1897. Kennard, A. S., Benenden, Mackenzie Road, Beckenham, Kent.
 1902. Kensett, Percy F., Holmesdale, Harewood Road, Merton, London, S.W.
 1897. Kenyon, Mrs. Agnes Fleming, 291, Highett St., Richmond, Melbourne, Victoria.
 1887. Kew, H. Wallis, F.Z.S., 157, Ferme Park Road, Hornsey, London, N.
 1900. Killingbeck, J. H., Llwyn On, Abbey Place, Llangollen, N. Wales.
 1889. Knight, Rev. G. A. Frank, M.A., F.R.S.E., St. Andrew's Manse, Auchterarder, Perthshire.
1901. Laidlaw, F. F., B.A., Owens College, Manchester.
 1899. Lancaster, Ernest Le Cronier, B.A., M.B., Winchester House, Swansea, S. Wales.
 1879. Laver, Henry, M.R.C.S., F.L.S., Head Street, Colchester, Essex.

1894. Lawson, Peter, 11, The Broadway, Walham Green, London, S.W.
 1900. Lebour, Miss M. V., Radcliffe House, Corbridge-on-Tyne, Northumberland.
 1878. Leicester, Alfred, Scottdale, New Ferry, Cheshire.
 1899. Lightfoot, Robert M., South African Museum, Cape Town.
 1896. Linton, John, 25, Wordsworth Road, Smallheath, Birmingham.
 1897. Lodder, Miss Mary, Bank of Australasia, Launceston, Tasmania.
 1895. Loydell, A., 36, Milton Road, Acton, London, W.
 1898. Lucas, B. R., 3, Dyar Terrace, Winnington, Northwich, Cheshire.
 1891. Lyons, Lady, Kilvrough, Parkmill, R.S.O., Glamorganshire, S. Wales.
1889. MacAndrew, James J., F.L.S., etc., Lukesland, Ivy Bridge, Devonshire
 1885. McKean, Kenneth, F.L.S., Lloyds, London, E.C.
 1886. McMurtrie, Rev. John, M.A., D.D., 13, Inverleith Place, Edinburgh.
 1884. Madison, James, 167, Bradford Street, Birmingham.
 1885. Marquand, Ernest D., A.L.S., Belle Vue, Alderney.
 1887. Marshall, J. T., Sevenoaks, Torquay, Devonshire.
 1887. Masefield, John R. B., M.A., Rosehill, Cheadle, Staffordshire.
 1899. Mason, G. E., 11B, Stanford Place, Stanley Bridge, Fulham, London, S.W.
 1888. Mason, Philip Brooke, J.P., M.R.C.S., F.L.S., etc., Trent House, Burton-on-Trent.
1897. May, William Lewis, F.R.S. Tasm., Forest Hill, Sandford, Tasmania.
 1889. Mayfield, Arthur, Mendlesham, Stowmarket, Suffolk.
 1880. Melvill, James Cosmo, M.A., F.L.S., Brook House, Prestwich, Manchester
 1891. Middleton, Robert, Gledhow, near Leeds.
 1888. Milne, J. Grafton, Holly House, Plaistow, London, E.
 1879. Milnes, Rev. Herbert, M.A., Berkeley Villa, Berkeley St., Cheltenham.
 1891. Mitchell, James, 240, Darnley Street, Pollokshields, Glasgow.
 1902. Moore, Chas. H., 5, Mill Street, Stocks Lane, Stalybridge.
 1891. Morris, Cecil Herbert, Lewes, Sussex.
 1899. Morris, G. M., 18, Northen Grove, W. Didsbury, Manchester.
 1891. Moss, William, F.C.A., 13, Milton Place, Ashton-under-Lyne.
1899. Neild, J. E., Gilda Brook Road, Eccles, near Manchester.
 1887. Newstead, A. H. L., 38, Green Street, Bethnal Green, London, E.
 1891. Newton, Richard Bullen, F.G.S., 7, Melrose Gardens, West Kensington Park, London, W.
1903. Northey, Rev. A. E., M.A., Lisworney, Torquay.
 1891. Norman, Rev. Canon Alfred Merle, D.C.L., F.R.S., etc., The Red House, Berkhamstead.
1901. Norton, Miss E. M., Rosslyn, Westbury-on-Trym, near Bristol.
1901. Oelrichs, W., 3, Wexford Road, Oxtou, Cheshire.
 1887. Oldham, Charles, Brook Cottage, Knutsford, Cheshire.
 1899. Orr, Hugh Lamont, 29, Garfield Street, Belfast.
 1896. Overton, Harry, Ingleside, Clifton Road, Sutton Coldfield, Warwickshire.
1900. Pannell, Chas., jr., East Street, Haslemere, Surrey.
 1882. Parke, George H., F.L.S., etc., St. John's, Wakefield, Yorks.
 1887. Parry, Lieut.-Col. G. S., 18, Hyde Gardens, Eastbourne, Sussex.
 1898. Partridge, F. J., 75, High Street, Barnstaple, N. Devon.
 1902. Pattison, Ernest, 52, Regent Road, Leicester.
 1886. Pearce, Rev. S. Spencer, M.A., Long Combe Vicarage, near Woodstock Oxfordshire.
1901. Penrose, G., Royal Institution of Cornwall, Truro.

1896. Percival, A. Blayney, Somerset Court, Brent Knoll, Somerset.
 1896. Phillips, Robert Albert, Ashburton, Cork.
 1886. Ponsonby, John H., F.Z.S., 15, Chesham Place, London, S.W.
 1898. Poore, Arthur S., Heather View, West Heath Road, Bostall Heath, Abbey Wood, Kent.
 1895. Powell, Mrs. A., Nant-y-Velin, Criccieth, N. Wales.
 1897. Preston, Hugh Berthon, F.Z.S., 3, Sydney Terrace, Fulham Road, London, S.W.
1896. Ragdale, John Rowland, The Beeches, Whitefield, near Manchester.
 1899. Ramanan, Vedaraniam Venkata, M.A., F.Z.S., Tenali, Kistna District, S. India.
 1896. Rhodes, John, F.E.S., 360, Blackburn Road, Accrington, Lancs.
 1900. Richards, C. P., Mission House, Stenalees, St. Austell, Cornwall.
 1898. Roberts, A. William Rymer, The Common, Windermere.
 O Roebuck, Wm. Denison, F.L.S., 259, Hyde Park Road, Leeds.
 1901. * Rooth, J. A., Radcliffe Infirmary, Oxford.
 1893. Roseburgh, John, Market Square, Galashiels, Roxburgh.
 1892. Rosevear, John Burman, 109, New King's Rd., Fulham, London, S.W.
1877. Scharff, Robert F., Ph.D., M.R.I.A., Tudor House, Dundrum, Dublin.
 1895. *L* Schill, C. H., Broome House, Didsbury, near Manchester.
 1886. Scott, Thomas, F.L.S., 3, Menzies Road, Torry, Aberdeen.
 1893. Shackleford, Rev. Lewis John, 24, Chatburn Road, Clitheroe, Lancs.
 1892. Shillito, John G., 20, Elmore Road, Sheffield.
 1895. Sich, Alfred, F.E.S., Brentwood, 65, Barrowgate Rd., Chiswick, London, W.
 1896. Sidebotham, Dr. E. J., Erlesdene, Bowdon, Cheshire.
 1884. Skilton, Mrs. Mary, 21, London Road, Brentford, Middlesex.
 1902. Smallman, Raleigh S., Carlton House, Herne Hill, London, S.E.
 1886. Smart, Rev. R. W. J., M.A., Parkham Rectory, Bideford, N. Devon.
 1886. Smith, Edgar A., F.Z.S., Natural History Museum, Cromwell Road, London, S.W.
 1892. Smith, Mrs. Louisa J., Monmouth House, Monmouth St., Topsham, Exeter.
 1899. *L* Smith, Mrs. Lucy A., Cricklade Street, Cirencester.
 1894. Smith, Wm. Chas., 7, Vanston Place, Walham Green, London, S.W.
 1896. Smith, Wm. Rayson, Harleston, Norfolk.
 1900. Solly, E. H., 3, South Street, Deal, Kent.
 1886. *L* Somerville, Alexander, B.Sc., F.L.S., 4, Bute Mansions, Hillhead, Glasgow
 1887. Somerville, Rev. James E., M.A., B.D., Castellar, Crieff, N.B.
 1902. Sorby, Henry Clifton, LL.D., F.R.S., Broomfield, Sheffield.
 1886. Sowerby, Geo. Brettingham, F.L.S., 15, Station Parade, Kew Gardens, near London.
 1892. Span, Bartlet, Woodlands, Tenby, South Wales.
 1896. Sparkes, Thomas, 92, Heywood Street, Moss Side, Manchester.
 1900. Stacey, John, 22, Nithdale Road, Plumstead, Kent.
 1886. Standen, Robert, 113, Sewerby Street, Alexandra Park, Manchester.
 1888. Stanley, Frederick, Rokeby, Edgar Road, Margate, Kent.
 1888. Stirrup, Mark, F.G.S., High Thorn, Bowdon, Cheshire.
 1896. Stonestreet, Rev. W. T., 307, Gt. Clowes St., Higher Broughton, Manchester.
 1885. *L* Storey, J. A., B.A., Mafeking Villa, Locking Road, Weston-super-Mare.
 1897. Stracey, Bernard, M.B., Sutton Bonnington, Loughborough.
 1890. Stubbs, Arthur Goodwin, Staincliffe, Granville Road, Eastbourne.
 1893. Stump, Edward Consterdine, 16, Herbert St., Moss Side, Manchester.
 1899. Sturt, W. Neville, India Office, Westminster, London, S.W.

1895. Swanton, E. W., The Educational Museum, Haslemere, Surrey.
 1888. Sykes, Ernest Ruthven, B.A., F.L.S., etc., 3, Gray's Inn Place, Gray's Inn, London, W.C.
 1895. Sykes, Robert Dardsley, Lostock Hall, near Preston, Lancs.
 1895. Taylor, Frederick, 42, Landseer Street, Park Road, Oldham, Lancs.
 1897. Taylor, Rev. George W., F.R.S. Canada, etc., St. Matthew's Rectory, Wellington, British Columbia.
 O Taylor, John W., F.L.S., North Grange, Horsforth, Leeds.
 1895. Thompson, Isaac C., F.L.S., 53, Croxteth Road, Liverpool.
 1886. Tomlin, J. R. Brockton, M.A., Estyn, Chester.
 1897. Tulk-Hart, Eugene John, M.D., 4, Gloucester Place, Brighton.
 1898. Turner, E. Hartley, A.C.A., 21, Bairstow Street, Preston, Lancs.
 1899. Vaughan, J. Williams, J.P., The Skreen, Erwood, R.S.O., Radnorshire, S. Wales; winter address: Bryn-y-Mon, Tenby, S. Wales.
 1897. Vignal, Louis, 28, Avenue Duquesne, Paris.
 1902. Vincent, C. W., 39, West Bank, Stamford Hill, London, N.
 1902. Wadsworth, J. T., 15, Deramore Street, Moss Side, Manchester.
 1898. Wakefield, H. Rowland, 7, Montpelier Terrace, Swansea, S. Wales.
 1891. Walker, Bryant, 18, Moffat Building, Detroit, Michigan, U.S.A.
 1900. L Watson, Hugh, Bracondale, The Avenue, Cambridge.
 1886. Watson, Rev. R. Boog, LL.D., F.L.S., etc., 11, Strathearn Pl., Edinburgh.
 1900. Webb, Walter, F., 416, Grand Avenue, Rochester, N.Y., U.S.A.
 1895. Webb, Wilfred Mark, F.Z.S., 7, Campbell Road, Hanwell, London, W.
 1902. Weeks, Wm. H., jr., 508, Willoughby Avenue, Brooklyn, U.S.A.
 1895. Welch, Robert John, 49, Lonsdale Street, Belfast.
 1897. West, H. J., 80, Upland Road, East Dulwich, London, S.E.
 1886. Whitwell, Wm., F.L.S., Underhill, Kidderminster Road, Hagley, near Stourbridge.
 1901. Wilde, J. W., 17, Hendon Road, Sparkbrook, Birmingham.
 1889. Williams, John M., 20, Hackins Hey, Liverpool.
 1891. Williamson, Rev. Charles Arthur, M.A., 14, Upper Mount Street, Dublin.
 1899. Wilson, Arthur Ernest, 228, Victoria Street, Grimsby.
 1890. Wood, Albert, Midland Lodge, Sutton Coldfield, Warwickshire.
 1901. L Woodruffe-Peacock, Rev. E. A., F.L.S., etc., Cadney, Brigg, Lincs.
 1898. Woods, Henry, M.A., F.G.S., St. John's College, Cambridge.
 1886. L Woodward, Bernard B., F.L.S., etc., 120, The Grove, Ealing, London, W.
 1895. Wright, Charles East, Woodside, Rockingham Road, Kettering.

Self-Fecundation in *Planorbis vortex*.—On February 2nd, 1901, an adult specimen of *Planorbis vortex* was isolated under the following conditions: A glass vessel of 60-oz. capacity, being three-fourths filled with boiled water, a small quantity of weed was placed in it, and the remaining fourth-part of the vessel was filled with pure oxygen. The whole was perfectly sealed up, and this condition was maintained for eighteen months until August, 1902. During this period the water remained exceptionally clear and the weed in good condition. The snail on the whole was rather inactive, often spending weeks together adhering to the glass high and dry above the water. In June, 1902, after sixteen months of complete and absolute isolation, it deposited some eggs; early in July these hatched out, producing twenty-seven young, many of which are still thriving in their confined situation. —W. H. CHADWICK (*Read before the Society*, December 10th, 1902).

NOTES ON THE LAND AND FRESHWATER SHELLS OF BARBADOS.

BY LEWIS B. BROWN.

(Read before the Society, September 10, 1902).

THE following notes are published in continuation of the paper by Mr. Edgar A. Smith and Col. H. W. Feilden.¹ Thirty-one species were then given to which are now added thirteen as new to the island and recently collected—these are marked in the accompanying table with an asterisk. The following species have also been added, namely:—*Pleurodonte dentiens* on the authority of Mr. E. W. Williams, who has collected specimens in the Pine Estate Woods, and *Neritina virginia*, a brackish-water species, that doubtless had been collected before, but was omitted from the list, making a total of forty-six species. Mr. E. A. Smith stated that only five appeared to be peculiar to Barbados. Two freshwater forms, *Limnæa cubensis*, var. and *Paludestrina ventrosa* and one terrestrial, *Cæcilianella acicula*, have been introduced.

The finding of *Helicina barbadensis* in Porter's Wood and elsewhere removes the doubt as to the correct localization of the specimens in Cuming's collection, but the occurrence of the following species must still remain doubtful:—*Vitrea incisa*, *Pleurodonte perplexa*, *Thysanophora turbiniformis*, *Bulimulus tenuissimus*, *B. fraterculus*, *Opeas gundlachi*, *Helicina conoidea*, and *Physa granulata*. The writer has collected all in the accompanying list with the exception of these eight.

A few remarks on the thirteen new species found will not be out of place. It will be noticed that whilst *Vitrea incisa* has not yet been collected, a new form *Vitrea implicans*, identified by the authorities of the Smithsonian Institution, has been secured; this is not new to the West Indies, however, as it is recorded from Trinidad.² Although only two dead specimens of *Cerion uva* have been secured, they have been added to the list, as they were found so far apart that others may be expected to occur. *Ennea bicolor*, *Cæcilianella minutissima*, *C. aperta*, *Helicina rugosa*, and *Opeas ascendens* have doubtless been introduced from the neighbouring islands, where they are all found, as will be seen by the Table of Distribution. *Cæcilianella acicula* has probably been introduced from Europe.

Of the four new freshwater forms, two at least are of a very interesting character, namely:—*Limnæa cubensis*, var. and *Paludestrina ventrosa*. The latter is a native of the Mediterranean region, occurring in Great Britain, along the coast of west and north-west Europe, and

¹ *Ann. and Mag. Nat. Hist.*, ser. 6, vol. 8, p. 247-257, Sep., 1892.

² Smith "Mollusca of Trinidad," *J. Conch.*, vol. 8, p. 238, 1898.

probably of the Baltic, and its introduction into Barbados is not yet accounted for. As stated above, *Limnæa cubensis* var. must be considered peculiar to Barbados, as will be seen by the remarks of Mr. Chas. T. Simpson, of Washington, who kindly identified it and compared it with specimens in the United States National Museum (see page 271). The remaining species, *Planorbis cultratus* and *P. circumlineatus*, have doubtless been introduced from St. Vincent or some of the other neighbouring Islands. The former has been found in several pools in different localities: the dispersal of many varieties is doubtless attributable to direct personal agency, as living plants are continually being imported from the neighbouring colonies; moreover, large numbers of water birds resort to our pools and swamps annually from the delta of the Mississippi and Florida, and visiting, as they do, some of the islands in transit may be responsible for the introduction of new freshwater species.

The relationship of the fauna of Barbados is plainly set forth in the accompanying table, and a reference to that will prove interesting. It will be seen that sixteen of the species are found in Trinidad, fourteen in St. Vincent, seventeen in Cuba, twelve in Grenada, ten in Guadeloupe, eight in Dominica, and six in St. Lucia and five in Martinique, whilst twelve are found in different parts of South America. Three species, *Subulina octona*, *Opeas beckiana* and *Leptinaria lamellata* are common to nearly all the West Indies and portions of South America also. One species, *Vitrea implicans*, is found only south of Barbados, whilst eleven are only found north of this island. At present it would be unwise to draw any general conclusions as to the distribution of the land shells throughout the West Indies and South America, as the northern or lesser islands have been so little worked.

Reference has been made to the distinct colour-forms in *Pleurodonte isabella*, *Bulinulus exilis* and *Neritina virginea* as in each case the markings are so very distinct that record should be kept of them. In the case of *P. isabella* the horn-coloured and white-lipped variety has been met with in only one gully, mixed with typical species, but the varietal forms of *Bulinulus exilis* are met with all over this island and the other islands as well. A type collection of nearly all the species enumerated has been placed in the recently-formed Museum attached to the Barbados Natural History Society.

In conclusion, the author desires to place on record his appreciation of the great encouragement he has received from Mr. W. Moss, who also enlisted the aid of Mr. Edgar A. Smith and Mr. J. H. Ponsonby in the determination of the specimens. His thanks are further due to Mr. Smith for kindly revising the manuscript, and for the interest he has shown in the publication of these notes.

Vitrea incisa Pfeiffer.—Barbados (E. A. Smith). Not yet found by author.

V. implicans Guppy.—Trinidad. It has only been secured in Porter's Wood, St. James.

Pleurodonte perplexa Férussac.—Grenada, Trinidad? Barbados (E. A. Smith); Martinique, St. Vincent?, Grenadines.—This seems a common species in Grenada, but no specimens have been met with here to confirm its ever having been collected before.

P. isabella Férussac.—Cayenne. Found throughout the island in the woods and gullies. Specimens exhibiting a great variety of markings and colourings have been secured, from horn colour with slight markings and light brown lips, to dark brown with an almost black lip, and in a gully close to Malvern Lodge, St. Michael's, some very pretty forms were met with of a clear horn colour with pure white lips, making them the handsomest shells to be found in the island. A very minute parasite belonging to the *Acaridæ* is generally found on this animal, but the author has not noticed it on any other species.

P. dentiens Férussac. — Martinique, Dominica, Guadeloupe, Cayenne. Specimens have been found by Mr. E. W. Williams in Pine Wood Estate, St. Michael's, but this has not yet been confirmed by the author.

Eulota similis Férussac.—Cuba? Brazil, Honolulu. Introduced; a very common species.

Thysanophora turbiniformis Pfeiffer.—Cuba, Jamaica. Not yet discovered by author.

T. vortex Pfeiffer.—Cuba, St. Croix, Hayti, Jamaica, St. Thomas, Porto Rico, Bermuda, Georgia, and Florida. Only dead specimens have been obtained up to the present, but in different localities, so it is probable that it is still living in the island.

Streptaxis deformis Férussac.—Venezuela, Demerara, Surinam, Trinidad. This has been met with in different parts of the island, in some gardens in Bridgetown in large numbers.

Strophocheilus¹ (**Borus**) **oblongus** Müller.—St. Vincent, Tobago, Trinidad, northern parts of South America from New Granada to Brazil. This species lays a white egg about the size of a blackbird's; the white of fresh eggs is largely used as an adhesive for mending china and glass, being superior, it is stated, to any manufactured substance. The snail has been eaten by the natives, but not in recent years. The eggs take from three to four weeks to hatch, and the newly-formed shell is almost transparent.

Bulimulus tenuissimus Férussac. — Brazil, Cayenne, etc., Barbados, (Pfr.) Grenada, St. Lucia, Dominica. Not yet met with.

¹ *Strophocheilus* must be employed in place of *Bulimus*.

B. fraterculus Férussac.—Guadeloupe? Porto Rico, Antigua, St. Kitts, St. John's, St. Croix, St. Thomas, Trinidad, Barbados (Bland). Not yet met with.

B. exilis Gmelin.—St. Vincent, Guadeloupe, St. Thomas, Porto Rico, Barbados, Dominica, Cayenne; the author has also received it from Antigua. One of the commonest shells in the island, but varying considerably in markings and colouring, five distinct forms have been received :—

- (a) Horn colour, bandless, the most common.
- (b) Dark brown colour; bandless.
- (c) Light brown colour, slightly banded.
- (d) Dark brown colour, heavily banded.
- (e) Horn colour, with single brown band.

Only one specimen of this last has been met with, in a gully close to Codrington House, St. Michael's. It was not full grown, but the markings are quite distinct from the others.

Orthalicus zebra Müller.—Trinidad, St. Vincent, Carriacou, &c.¹ Jamaica, Cayenne. Found around Bridgetown, but not in the outlying districts, frequenting Lime and Frangipani trees and the Cabbage Palms in the Belleville district. The markings vary considerably and lose nearly all the brilliancy in the older shells. The species found here seems identical with that from Carriacou, Grenada, but the Trinidad species differs in the markings. Pilsbry² has placed the West Indian, Floridan, and Mexican species which ought to be called *Orthalicus*, in the genus *Oxystyla*, and Mr. Chas. T. Simpson thinks this species seems to be rather *O. princeps* Brod., than *O. undata* or *O. zebra*, and states that it is apparently identical with Mexican and Central American shells in the Smithsonian Institution collection, and with shells collected by himself at the Bay Islands, Honduras.

Pineria viequensis Pfeiffer.—Only found in Vieque (not province of Porto Rico) and Barbados. Found in numbers along the St. Philip's coast on the coral rocks bordering the sea.

Ennea (Huttonella) bicolor Hutton.—Probably introduced from East Indies where it is widely distributed, to St. Thomas and Trinidad (Bland), Grenada (Edgar A. Smith), St. Lucia (Gibbons), and specimens have recently been received alive from Dominica. Found in gardens in Bridgetown, Belle Plantation Wood, and St. Philip's under dead leaves and stones.

Cæcilianella minutissima Guppy.—Trinidad, St. Vincent. This minute shell was first found in Porter's Wood, St. James', and has since been met with in other parts of the island along with *C. aperta*.

¹ *Proc. Malac. Soc.*, vol. 1, p. 306, 321, 1895.

² Tryon, "Man. Conch. Helicidæ," vol. 12, p. 105, 1899.

C. aperta Guilding.—St. Vincent. See remarks on *C. minutissima*.

C. acicula Müller.—Palæarctic, and probably introduced as only a single specimen was found in Porter's Wood along with *C. minutissima*.

C. gundlachi Pfeiffer.—Only found in Porter's Wood.

Subulina octona Chemnitz.—Most West India Islands, South America, Africa, etc. Even more common than *Bulimulus exilis*; found all over the island, the largest specimen measured 0.75 inch in length.

Opeas subula Pfeiffer.—Grenada, Trinidad, Florida, Mexico, Cuba, Porto Rico, Fernando Noronha; also Sarawak, Borneo (in Brit. Mus.) Habits like those of *S. octona*, but only a few specimens found.

O. beckiana Pfeiffer.—Peru, Nicaragua, Caraccas, Trinidad, Brazil, Fernando Noronha, St. Vincent, Grenada, St. Lucia, Dominica, Guadeloupe. Habits similar to those of *S. octona* but not so common.

O. goodalli Miller.—Cuba, Porto Rico, Jamaica, Guadeloupe, St. Vincent, St. Thomas, and South America. Found under stones and dead leaves, but not common.

O. octonoides C. B. Adams.—Jamaica, St. Thomas, Cuba, Grenada? St. John's. See remarks on *S. goodalli* above.

O. gundlachi Arango.—Cuba, Barbados, (Bland). Not yet received by the author.

O. ascendens Poey—Cuba. Porter's Wood, St. James's, only a few specimens found. [This I believe to be a synonym of *S. goodalli*.—E.A.S.].

Pupa pellucida Pfeiffer.—Jamaica, Cuba, Grenada. This small species has been found in great numbers under stones, in different localities on the Island.

Cerion uva L.—Curaçao (Bland). Only two dead specimens found, one in St. Peter's and the other in St. Philip's parishes, both by the Rev. N. B. Watson.

Succinea barbadensis Guilding.—Bermuda. A common species; the author also has some fossil forms of this shell from the horizontal marls in Antigua, but it is not found alive in that Island now.

Leptinaria lamellata Pot. & Mich.—Porto Rico, Guadeloupe, Grenada, St. Vincent, Trinidad, Dominica, Venezuela, Demerara, Guayaquil, Peru, and the writer has recently found it in St. Lucia. Found in different parts of the Island, under stones, a very large specimen was met with in St. Philip's churchyard of an unusual form and exceedingly beautiful, and Mr. E. A. Smith writes of it, "the lamella is sometimes absent, and the whorls are also marginate at times below the suture as in this specimen."

Cylindrella (Gongylostoma) costata Guilding.—St. Lucia, Dominica. Found in large numbers all over the Island; in the rainy season it was frequently seen on cocoa-nut trees and in the gulleys.

Truncatella barbadensis Pfeiffer. This is one of the species peculiar to Barbados and has been met with all over the island.

Helicina substriata Gray.—St. Kitts, and the writer has also received it from Barbuda. Found all over the island, some of the shells being very prettily marked and coloured, a bright yellow variety was met with in several places.

H. barbadensis Pfeiffer.—Peculiar to Barbados. Found in Porter's Wood and other localities, but not common.

H. rugosa Pfeiffer.—Cuba, Hayti, St. Vincent. Found along with *H. barbadensis* in Porter's Wood. It is a smaller shell and can be identified by the very strong diagonal striation.

H. conoidea Pfeiffer.—Barbados (in coll. Cuming). The author has not yet met with this species.

Physa rivalis Maton & Rackett.—Brazil, Cuba, St. Vincent, Trinidad, Grenada. In the swamps and pools in the island this was found in large numbers.

P. granulata Shuttleworth.—Barbados (in coll. Cuming). Not yet met with.

Paludestrina crystallina Pfeiffer.—Cuba, Jamaica, Grenada, Antigua, Trinidad, South America. Found in large quantities in Graeme Hall Swamps feeding on grass (*Ruppia maritima*) and moss. It has also been met with in the centre of the island in a fresh water spring.

P. ventrosa Montagu.—Mediterranean region, along the coast of west and north-west Europe, and probably the Baltic. The only two specimens found were secured in Porter's Wood. They had evidently been washed up by the last season's rains, as one other fresh water species *Planorbis cultratus* was found at the same time.

Planorbis lucidus Pfeiffer.—St. Vincent, Martinique, Guadeloupe, Trinidad, Cuba, Porto Rico, Antigua. A few specimens only obtained from fresh springs on Westwood gully, St. Thomas.

P. cultratus d'Orbigny.—St. Vincent, Martinique, Guadeloupe, Antigua, Cuba. Found in several ponds and pools that dried up completely during last dry season.

P. circumlineatus Shuttleworth.—A single specimen found in Malvern Lodge gully, St. Michael's.

Limnæa cubensis Pfeiffer, var.—Found in large quantities in swampy field on Bryden's estate, St. Michael's. The identification of this species was undertaken by Mr. Charles T. Simpson, of the Smithsonian Institution, Washington, who refers to it as follows:—"The *Limnæa* is, I think, without doubt *L. cubensis* Pfr. variety, equal to specimens found on various parts of the United States, which received the name *L. umbilicatus* C. B. Adams. Pfeiffer's shells were probably

solidèr and certainly shorter than yours, and I have seen no other shells from the West Indies which are quite so elongated and thin as yours, though they agreed most perfectly with some of our shells in the United States, but Pilsbry,¹ who is the best authority, states that they have in the Philadelphia Academy Collection, West Indian *L. cubensis* which absolutely cancels Adams' *L. umbilicatus*, and that the species is found through Mexico, Yucatan, etc., that it varies a good deal in form, etc. All the West Indian specimens of *L. cubensis* in our collection differ a little from your Barbados specimens as they are a little shorter and more solid than yours, and appear to agree with the Cuban specimens described by Pfeiffer as *L. cubensis*."

Mr. Simpson goes on to state that *L. cubensis* (Pfr.) has been quite generally confounded in the United States with *L. humilis* (Say), but in the latter the expansion of the columella is narrower and the columella is more plaited or flattened out and straight. Yet here are intermediaries which point to a connection of the two.

Neritina virginea Linn.—Grenada, Trinidad, South America. Found in the different brackish streams near the coast; in Beckles Spring, St. Michael's, some very pretty colour varieties were found.

- (a) Dark green, with lighter green spots and markings.
- (b) Dark green, with yellow bands.
- (c) Dark green, with red bands.
- (d) Black, with brownish spots.

TABLE OF DISTRIBUTION OF SPECIES ON FOLLOWING PAGE.

¹ *Proc. Acad. Nat. Sci. Philadelphia*, 1891, p. 320.

TABLE OF THE DISTRIBUTION OF THE SPECIES.

| NAMES OF THE SPECIES. | | | | | | | | | | | | | OTHER LOCALITIES. | |
|---|----------------|--------------|----------|-----------|------------|-------------|-----------|-------------|-------------------------|----------|-------|----------|-------------------|--|
| | Barbados only. | St. Vincent. | Grenada. | Trinidad. | St. Lucia. | Martinique. | Dominica. | Guadeloupe. | Isls. north of G'loupe. | Jamaica. | Cuba. | Cayenne. | S. America. | |
| <i>Vitrea incisa</i> ... | ... | × | | | | | | | | | | | | |
| <i>V. implicans</i> ... | ... | | | × | | | | | | | | | | |
| <i>Pleurodonte perplexa</i> ... | ... | × | × | × | | × | | | | | | | | Grenadines |
| <i>P. isabella</i> ... | ... | | | | | | | | | | | | | |
| <i>P. dentiens</i> ... | ... | | | | | × | × | × | | | | × | × | |
| <i>Eulota similaris</i> ... | ... | | | | | | | | | | × | | × | Intro. into Honolulu |
| <i>Thysanophora turbiniformis</i> ... | ... | | | | | | | | | | × | | | |
| <i>T. vortex</i> ... | ... | | | | | | | | × | × | × | | | |
| <i>Streptaxis deformis</i> ... | ... | | | × | | | | | | | | | | Bermuda, Haiti |
| <i>Strophocheilus (Borus) oblongus</i> ... | ... | × | | × | | | | | | | | | × | Tobago |
| <i>Bulimulus tenuissimus</i> ... | ... | | × | | × | | × | | | | | | | |
| <i>B. fraterculus</i> ... | ... | | | × | | | | × | × | | | | | |
| <i>B. exilis</i> .. | ... | × | | | | | × | × | × | | | | | |
| <i>Orthalicus zebra</i> ... | ... | × | | × | | | | | | × | × | × | | Grenadines, Cariacou |
| <i>Pineria viequensis</i> ... | ... | | | | | | | | | | | | | Viéque |
| <i>Ennea (Huttonella) bicolor</i> ... | ... | | × | × | × | × | | × | | | | | | India, Seych's, China, New Caledonia, etc. |
| <i>Cæcilianella minutissima</i> ... | ... | × | | × | | | | | | | | | | |
| <i>C. aperta</i> ... | ... | × | | | | | | | | | | | | |
| <i>C. acicula</i> ... | ... | × | | | | | | | | | | | | |
| <i>C. gundlachi</i> ... | ... | | | | | | | × | | × | | | | Haiti, St. Thomas, St. Martin |
| <i>Subulina octona</i> ... | ... | × | × | × | × | × | × | × | × | × | × | × | × | Central Africa |
| <i>Opeas subula</i> ... | ... | | × | × | | | | × | | × | | | × | Sarawak, Borneo |
| <i>O. beckiana</i> ... | ... | × | × | × | × | | × | × | | | | | × | Haiti |
| <i>O. goodalli</i> ... | ... | × | | | | | × | × | × | × | × | | × | |
| <i>O. octonoides</i> ... | ... | | | × | | | | × | × | × | × | | | |
| <i>O. gundlachi</i> ... | ... | | | | | | | | × | × | × | | | |
| <i>O. ascendens</i> ... | ... | | | | | | | | | | × | × | | |
| <i>Pupa pellucida</i> ... | ... | | × | | | | | | | × | × | | | |
| <i>Cerion uva</i> ... | ... | | | | | | | | | | | | | Curaçao |
| <i>Succinea barbadensis</i> ... | ... | | | | | | | | | | | | | Burmuda |
| <i>Leptinaria lamellata</i> ... | ... | × | × | × | × | × | × | × | | | | × | | |
| <i>Cylindrella (Gongylostoma) costata</i> ... | ... | | | | × | | × | | | | | | | |
| <i>Truncatella barbadensis</i> ... | ... | × | | | | | | | | | | | | |
| <i>Helicina substriata</i> .. | ... | | | | | | | | | | | | | St. Kitts, Barbuda |
| <i>H. barbadensis</i> ... | ... | × | | | | | | | | | | | | |
| <i>H. rugosa</i> ... | ... | × | | | | | | | | | | | | Haiti |
| <i>H. conoidea</i> ... | ... | × | | | | | | | | | × | | | |
| <i>Physa rivalis</i> ... | ... | | × | × | × | | | | | | | | × | |
| <i>P. granulata</i> ... | ... | × | | | | | | | | | × | | × | |
| <i>Paludestrina crystallina</i> ... | ... | | × | × | | | | × | × | × | × | | × | |
| <i>P. ventrosa</i> ... | ... | × | | | | | | | | | | | | Mediterranean |
| <i>Planorbis lucidus</i> ... | ... | | | × | | × | | × | × | | × | | | |
| <i>P. cultratus</i> ... | ... | × | | | | × | | × | × | | × | | | |
| <i>P. circumlineatus</i> ... | ... | | | | | | | × | | | | | | Haiti, Porto Rico, St. Thomas |
| <i>Limnæa cubensis</i> , var. | ... | × | | | | | | | | | | | | |
| <i>Neritina virginea</i> ... | ... | | × | | | | | | | | | × | | |

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND

313th (Annual) Meeting, October 25, 1902.

Held at the Manchester Museum, Owens College.

Professor S. J. Hickson, F.R.S., in the chair.

Appointment of Scrutineers.

Messrs. R. Cairns and F. Taylor were appointed Scrutineers.

Appointment of Auditors.

Messrs. J. W. Jackson and E. C. Stump were appointed Auditors.

New Member Elected.

Rev. A. E. Northey, M.A., Lisworney, Torquay.

Names Struck Off.

The following names have been removed from the list of members in accordance with Rule 4:—Messrs. F. R. Clifton and Oswald Dawson.

Annual Report and Balance Sheet.

The Annual Report of the Council (p. 275), the Report of the London Branch (p. 281), and the Treasurer's Report (p. 276), were presented and adopted.

Reports of Committees.

The Report of the Committee appointed to draw up a List of British Marine Mollusca was presented and read, and it was intimated that the list, having now been published, the Committee had been dissolved. It was resolved that the best thanks of the Society be given to the Committee for their services.

The Committee for Collective Investigation intimated that they had not received sufficient information on which to base a report, and did not seek re-appointment.

Election of Officers and Council.

The Scrutineers reported that forty-seven valid papers had been received, and that with one exception they were unanimously in favour of the list as nominated by the Council. The Officers and Council enumerated in the list (see p. 259) were therefore declared to be duly elected.

Address.

Professor W. A. Herdman, D.Sc., F.R.S., then delivered an Address on

"A Recent Visit to the Pearl Fisheries of Ceylon,"

on the conclusion of which a cordial vote of thanks was tendered to him.

Exhibits.

By Professor W. A. Herdman: A series of pearl oysters (*Meleagrina*) with pearls, from Ceylon, and various carnivorous Gastropods which prey upon the oysters.

By Mr. Lionel E. Adams: Examples of *Helix virgata*, *Ianthina*, *Boltenia*, and *Lacuna*, from Mediterranean localities.

By Mr. C. E. Wright: *Helix hortensis* and *H. caperata* from North Hants.

By Mr. J. M. Williams: *Turbo petholatus*, a large series of selected specimens shewing the remarkable range of pattern and colouration in this most variable and beautiful species; a gigantic specimen of *Cypræa pantherina* v. *juvenca*; *C. physis* with unusually brilliant dorsal markings; and *C. citrina* in a perfect condition rarely seen.

By Mr. J. W. Jackson: Sinistral *Helix rotundata* from Castleton, Derbyshire.

By Mr. F. Taylor: *Paludestrina jenkinsi* and *P. taylori*, a fine series, showing growth stages, from minute fry upwards, together with form and colour variation.

By Mr. A. Leicester: Sinistral *Helix pomatia* from Kent; *Littorina rudis* of unusual size, banded varieties of both type and var. *tenebrosa*, the latter being a rare form; also *Trochus lineatus* from Barmouth.

By Mr. E. Collier : Six drawers of exotic land operculates, 525 species, representing 42 genera, and including many of the rarest and most beautiful forms of this attractive group.

By Mr. W. Moss : *Pleurodonte perplexa*, Grenada ; *P. badia*, Dominica ; *P. orbiculata*, St. Lucia—a large series of each showing range of variation ; *Bulinus oblongus*, with eggs and young, from Trinidad ; *B. vincentinus*, from Trinidad ; *B. binominis* and var. *lascellesi*, from Perak ; *Helicina keatei*, Grenada ; and *Helix isabella*, from Barbados.

By Dr. G. W. Chaster : Many locality sets of all the British *Vertigines* and *Pupidæ*, including *Vertigo liljeborgi* ; also *Succinea oblonga* from its various Irish stations.

By Mr. W. J. Hall : A set of paintings of marine shells on rice paper by native Chinese artists.

By Mr. T. Edwards : British *Rissoæ* and *Odostomia* ; *Purpura lapillus*, vars. ; jar of Samian ware, covered with oysters, dredged off Thanet, Kent ; *Buccinum undatum*, a remarkably fine series of sinistral, acuminate, and normal forms, shown also in section, and sinistral and normal var. *carinata* ; malformed and sinistral *Neptunca antiqua*, all from Thanet coast.

By Mr. J. R. Brockton Tomlin : Sinistral *Helix ericetorum* and *H. nemoralis*, from Bundoran, also scalariform *H. nemoralis* from same locality ; *H. pomatia* and *H. aspersa*, sinistral and scalariform, from the Crosse Collection ; “repaired” *H. aspersa* and two shells grown together ; *Vertigo liljeborgi* from Ballynahinch, Co. Galway ; *V. heldi* from Co. Antrim ; sinistral *Tritonofusus gracilis* from Dogger Bank.

By Mr. J. T. Wadsworth : Living specimens of *Helix fusca* and *Hyalinia draparnaldi* ; *Patella vulgata* and *Helix aspersa* killed by narcotisation with cocaine, and preserved in formalin, the animals well expanded and colours natural.

By Mr. F. F. Laidlaw : A fine set of *Alyceus*, *Pupina*, *Opisthostoma*, and other Operculates, including some recently-described species.

By Mr. R. Standen : Shells and calcareous eggs of exotic land snails, *Helix*, *Bulinus*, *Partula*, *Glandina*, etc. ; *Sphærium pallidum* from most of its known stations in Great Britain and abroad ; examples of the *Odontostominae* of South America ; *Pedicularia sicula*, *P. californica*, *P. pacifica*, *P. elegantissima*, and *P. rubida*.

By Mr. W. E. Hoyle : Photographs of *Pleurotomaria adansoniana* and other natural history specimens in colours, prepared by the Sanger Shepherd process.

By the Manchester Museum : Twenty drawers containing a portion (about 2,000 species) of the “Layard Duplicate Collection” ; the collections of *Partula*, *Bulinus*, *Amphidromus*, etc. ; *Barbula herculea*, the largest known Anodon, from Siberia ; *Cardium hians* from Algiers ; *Lunatia lewisi* from California ; *Rhodea gigantea* from Mexico ; and some fine types of *Eusalodium* and *Anostoma*.

ANNUAL REPORT, 1901-1902.

OWING to the last Annual Meeting having been held in September, eleven meetings have been held during the past year, from October 9th, 1901, to September 10th, 1902, inclusive, at which the attendance has been satisfactory.

Thirteen new members have joined the Society, and four have resigned ; two have been reluctantly struck off by the Council for non-payment of their subscriptions, and their names will be published in the *Journal* according to the rules.

There are at present on the roll ten honorary members, and 266 ordinary members, of whom fourteen are life members.

Five numbers of the *Journal* have appeared since the last Annual Meeting, containing 160 pages, 3 plates, and several other illustrations.

During the past year donations have been received to the Cabinet from the President, Messrs. W. Blake, L. B. Brown, Alfred Leicester, A. G. Stubbs, and W. Whitwell; to the Library (in addition to the periodicals and transactions acquired by exchange for the *Journal*) from Miss M. V. Lebour, Messrs. W. Wells Bladen, E. L. Bouvier and H. Fischer, Geo. S. Brady, T. D. A. Cockerell, W. H. Dall, G. K. Gude, H. Wallis Kew, E. D. Marquand, Dr. E. von Martens, J. R. B. Masfield, W. L. May, A. Mayfield, E. Nordenskiöld, E. R. Sykes, R. Tate, John A. Todd, J. W. Williams, and the Northumberland Sea Fisheries Committee.

The Society is also indebted to Messrs. J. H. Ponsonby and H. Wallis Kew for pecuniary assistance towards the illustrations, and to Mr. R. Welch for a photograph of abnormal *Helices* which has been reproduced in Plate II.; as well as to the Secretary for the card bibliography of Mollusca published by Dr. Field of Zürich.

The Committee appointed to draw up a revised List of British Marine Mollusca last year presented what it was believed would be its final Report, but, having been charged by the Council with the publication of a new edition of the List, they have carried out this work and have submitted a further Report on the alterations which have been found necessary. The Report will be printed in the *Journal* (see p. 280), and the List is now ready for issue. The Committee has therefore finished its labours and is dissolved, but the Council hope that members will not omit to communicate to the *Journal* any additions, corrections, or emendations which they think would be desirable in a future issue.

The Committee for Collective Investigation has not received sufficient information on which to base a Report, and has not been re-appointed.

The Balance Sheet for the year 1901 has been prepared by the Treasurer, and audited by Messrs. Oldham and Stump; an interim balance sheet with comments showing the present state of the Society's finances has also been prepared and ordered to be laid before the Annual Meeting.

The Council desire to draw the attention of members to the great importance of prompt payment of their subscriptions. By delay, not only is a considerable amount of needless labour thrown upon the Treasurer, but there is great waste of the Society's meagre funds involved in the payment of postages. The Council trust that it is only necessary to call the attention of members to this matter in order to bring about a more satisfactory state of affairs.

Balance Sheet for the Year 1901.

| RECEIPTS— | £ | s. | d. | EXPENDITURE— | £ | s. | d. |
|-----------------------------|----|----|----------|-------------------------------|----|----|----------|
| Balance | 1 | 19 | 4 | Winstanley, Bookbinding | 0 | 3 | 0 |
| Subscriptions | 50 | 15 | 6 | Library Cards | 1 | 4 | 8 |
| Three Life Composition Fees | 9 | 9 | 0 | Journals for Jan., Apr., July | 48 | 16 | 6 |
| Sale of Publications ... | 6 | 19 | 0 | Reprints | 4 | 3 | 0 |
| Donations— | | | | Stationery | 0 | 1 | 6 |
| W. E. Hoyle | 1 | 1 | 0 | Taylor's Monograph, pt. 5 | 0 | 5 | 0 |
| Do. | 1 | 4 | 8 | Treasurer's Expenses ... | 1 | 12 | 0 |
| A. G. Stubbs | 0 | 2 | 6 | Editor's and Secretary's do. | 6 | 4 | 8 |
| J. T. Marshall | 2 | 2 | 0 | Balance in hand ... | 12 | 7 | 8 |
| E. A. Smith | 0 | 5 | 0 | | | | |
| J. H. Ponsonby | 1 | 0 | 0 | | | | |
| | | | | | | | |
| | | | 5 15 2 | | | | |
| | | | | | | | |
| | | | £74 18 0 | | | | £74 18 0 |

Interim Balance Sheet for the year 1902, up to date.

[illegible]

The only outstanding accounts are the *Journals* for July and October, 1902, to set against which are the subscriptions still unpaid.

314th Meeting, November 12, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

The usual Periodicals received in exchange.

Candidates Proposed for Membership.

Fred L. Button, 969, Broadway, Oakland, California.

Charles Herbert Moore, 5, Mill Street, Stocks Lane, Stalybridge.

Resignation.

Mr. W. J. Edwards.

Papers Read.

"The Land and Freshwater Shells of the Channel Islands," by J. R. Brockton Tomlin and E. D. Marquand.

"Report on the Bardsley Ramble," by F. Taylor.

"*Turricola terrestris* and *Helix virgata*," by the Rev. J. W. Horsley.

"*Helix pisana* var. *alba* in Guernsey," by J. E. Cooper.

Exhibits.

By Mr. F. Taylor : *Helix lapicida*, type and pale-yellow variety, *H. rufescens*, *Buliminus obscurus*, *B. montanus*, in all stages of growth, *Clausilia rolpfi*, *Cl. perversa* with peculiar elongated mouth, *Cl. laminata* type and white variety, *Pupa muscorum*—all from Cranham Woods, Gloucester ; also a series of *Helix pulchella* from Riversvale, *Cochlicopa lubrica*, *Helix pygmaea*, *Vertigo substriata*, *Hyalinia fulva*, *Hy. nitida*, *Hy. radiatula* from Holden Clough, Park Bridge, and specimens of land mollusca from other Lancashire localities.

By Mr. J.W. Jackson : *Helix fusca*, Compstall Woods; *H. hispida* var *hispidosa* and a scalariform specimen of the same, from Marple Woods; *Vittrina fellucida*, large and opalescent shells, from the canal bank, Marple, Cheshire; *Planorbis nautilius*, type, and a number of remarkable scalariform specimens from a pond in Hough End Clough, near Manchester.

By Mr. Edward Collier : Some ivory Japanese netsukés in the form of shells, showing the exactitude of the Japanese artists in imitating the natural objects.

By Rev. J. W. Horsley : *Helix aspersa*, *H. virgata*, and *H. terrestris*, to illustrate his paper.

By Mr. J. E. Cooper : *Helix pisana* var. *alba*, from Vazon Bay, Guernsey.

315th Meeting, December 10th, 1902.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

"Notes on the Holocene Mollusca of N. Cornwall," by the Rev. R. Ashington Bullen; "The Section Placostylus of Genus Bulimus," by Edward Collier; "A Synopsis of the Genus Streptaxis and its Allies," and "A Classified List of the Helicoid Land Shells of Asia," by G. K. Gude; "Lincolnshire Non-Marine Mollusca," by H. Wallis Kew (*from the respective authors*); and the usual Periodicals received in exchange.

New Members Elected.

Fred L. Button, 969, Broadway, Oakland, California.

Charles Herbert Moore, 5, Mill Street, Stocks Lane, Stalybridge.

Candidate Proposed for Membership.

S. Pace, Marine Biological Laboratory, Plymouth.

Members Deceased.

Mrs. Nutcombe Gould.

J. C. Mansell-Pleydell.

Major-General Linnæus Tripe.

Letters Read.

The subjoined letters from Mr. E. R. Sykes and Mr. R. Cairns were read :

3, Gray's Inn Place,

Dear Sir,

Gray's Inn, Oct. 4th, 1902.

In the October *Journal* (p. 247), I notice amongst the 'Exhibits' the following : "By Mr. Cairns : *Planorbis dilatatus*, discovered in the collection of the late Mr. T. Rogers, and, judging from the label, evidently the original specimens taken by him in 1869, and sent to Gwyn Jeffreys for identification. These historic specimens passed into Mr. Cairns' hands on the acquisition of Mr. Rogers' collection by Mr. H. B. Preston."

There appears to be some misapprehension. Mr. Rogers was, as will be known, in the habit of mounting his collection partly on glass slides, and when Mr. Preston acquired the collection one glass slide, now in my possession was found, having mounted upon it the following series of *P. dilatatus* :

- (1) Ten specimens labelled "*Planorbis dilatatus* Gould, Bolton Canal, June, 1869."
- (2) One specimen labelled "*Planorbis dilatatus* Gould, N. America, from Jeffreys."
- (3) Twelve specimens labelled "*Planorbis dilatatus* Gould, canal, Gorton, Aug., 1869."

The above details relating to the date and locality of the British specimens agree with those given in the *Journal* (vol. 1, p. 81).

Mr. Preston informs me that he acquired the entire collection, save for a few South African shells, and that he has not, so far as he is able to trace, sent any specimens of *P. dilatatus* to Mr. Cairns, as might be inferred from the paragraph which I have quoted above. No doubt the species was taken plentifully, but I think this statement shows that Mr. Rogers' "historic

specimens "are now in my hands, and since their destination may become of interest, I should be obliged by your insertion of this note.

Yours very truly,

The Secretary, the Conchological Society.

E. R. SYKES.

159, Queen Street, Hurst,

Dear Sir,

Ashton-under-Lyne, 7th Oct., 1902.

With reference to Mr. Sykes' letter, I still think that I have some of the original specimens collected by Mr. Rogers. They were in a small pill box, and marked in Mr. Rogers hand-writing "NEW?" evidently before they had been definitely named.

Now, as to the way these shells came into my possession. After Mr. Preston had taken away the collection, Miss Rogers told me that there were a number of boxes mostly full of shells which had been shown to Mr. Preston, but which he said only contained rubbish, and were of no use to him. Miss Rogers very kindly gave me permission to go through these and select what I wanted from them. The specimens of *Planorbis dilatatus* were among the "rubbish." The notice in the *Journal* should read "some of the original specimens," and with this emendation I think it is correct.

I am, yours very truly,

W. E. Hoyle, Esq.

ROBERT CAIRNS.

Papers Read.

"Self-Fecundation in *Planorbis vortex*," by W. H. Chadwick.

"Additional Notes on the Land and Freshwater Mollusca of Surrey," by Chas. Pannell, jun.

"The Land Shells of the Turton District," by J. W. Baldwin.

"The Association of *Helix nemoralis* and *H. hortensis*," by the Rev. S. Spencer Pearce.

"The Association of *Helix nemoralis* and *H. hortensis*," by R. Welch.

"*Clausilia bidentata* and *Balea perversa*," by R. Welch.

Exhibits.

By Mrs. J. M. Blundell: A very fine, thin, almost colourless form of *Succinea putris* from a ditch at Oaksey, near Cirencester, and series of *S. putris* and *S. elegans* from a neighbouring locality.

By Mr. B. R. Lucas: Some good sets of *Vertigo minutissima* and *Amalia sowerbyi* from Portland, Dorset; *V. pusilla*, *Helix pygmæa*, *Azeca tridens*, and *Hyalinia pura* from Winston, Dorset; *V. pygmæa* from South Molton, Dorset; and *Bythinia leachi*, *Limnæa peregrina*, and *L. glutinosa* from Deal, Kent; all collected during the past season; also *Voluta sophiæ* Gray from Thursday Island.

By Mr. F. Taylor: *Clausilia cravenensis*, sections showing different aspects of the clausium in situ; and contents of the gizzard of a Shelduck, consisting solely of *Paludetrina stagnalis*.

By Mr. W. E. Hoyle: A small squid (*Tracheloteuthis behni*) taken about ninety miles west of Slyne Head, Co. Galway, and furnishing the first record of the species in the British area.

By the Manchester Museum: A portion of a collection of Pendine marine shells, recently presented by Mr. A. G. Stubbs.

It was decided to hold the following **Special Exhibits for future Meetings**:

| | | |
|--------------------|---|---|
| January 14th, 1903 | - | Locality series of British <i>Clausiliæ</i> . |
| February 11th | „ | - British <i>Helix virgata</i> and its Varieties. |
| March 11th | „ | - British Species of <i>Planorbis</i> . |

REPORT OF THE COMMITTEE
APPOINTED TO DRAW UP A
REVISED LIST OF BRITISH MARINE MOLLUSCA
AND BRACHIOPODA.

(Read before the Society at the Annual Meeting, October 25, 1902).

IN preparing the Revised List of British Marine Mollusca for publication in accordance with the instructions passed at the last Annual Meeting, the Committee have found it necessary to make a few additions and alterations. These are as follows:—

- 65 **Adula** *H. & A. Adams* [= *Myrina*].
- 195 **Gari** *Schuhmacher* [= *Psammobia*].
- 234 **Pandora** *Bruguère* not *Hwass*.
- 274 Delete "*v. depressa Pennant*" and insert as a species "*depressa Pennant* [= *athletica*]."
- 277 *v. alba Norman* [= *pallida*].
- 328 For "*v. æstaurii*" read "*v. æstuarii*."
- 359 Insert the two species:—
 confusa (Frauenfeld) [= *similis*].
 v. candida Jeffreys.
 ventrosa (Montagu).
- 358 **Paludinella** *Pfeiffer* [= *Assimineæ*].
- 378 **Natica** *Scopoli* not *Adanson*.
- 394 **Cerithium** *Bruguère* not *Adanson*.
- 418 **Cima** *Monterosato* [= *Odostomia*].
- 468 Insert the species:—
 anceps Marshall.
- 471 Insert the species:—
 petitiana Brusina.
- 474 *stylifer (Turton)* [= *turtoni*].
- 499 Insert:—
 v. glaber Verkrüzen.
- 508 Delete "*v. tetragona S. V. Wood*."
- 513 After "*v. truncata Ström*" insert [= *T. truncatus*].
- 515 **Purpura** *Lamarck* not *Bruguère*.
- 603 For "**EOLIDIDÆ**" read "**ÆOLIDIIDÆ**."
 For "*Eolis*" read "*Æolidia*."
- 627 Insert:—
 [= *farrani, adelaidæ*].
- 630 Insert:—
 [= *pellucida, gracilis, smaragdina*].
- 641 For "**Antiopa Alder & Hancock**" read "**Antiopella Hoyle**"
 [= *Antiopa*]."
- 712 For "[= *biserialis*]" read "[= *biserialis & ruppellaria*]."

705 Insert :—

“*Tracheloteuthis Steenstrup*
behni Steenstrup.”

715 Insert :—

[=*oweni*].

A map, showing the limits of the British area, as adopted by the Committee, has been prepared and issued as a plate in the Journal, as well as printed in the new edition of the List.

The following names, which appear in Jeffreys, have been omitted either because they are not regarded as good species or because the evidence for their occurrence in the British area is inadequate.

158 *Donax trunculus L.*

283 *Emarginula cancellata Phil.*

587 *Aplysia melanops Couch.*

603 *Æolis inornata.*

Æolis purpurascens.

The list of varietal names which have been omitted is as follows:—

- | | |
|--|--|
| 46 <i>Anomia ephippium v. cylindrica Gm.</i> | <i>L. littorea v. sinistrorsa Jeffreys.</i> |
| 60 <i>Mytilus edulis v. incurvata Pennant.</i> | 338 <i>Alvania cancellata v. paupercula Jeffr.</i> |
| 94 <i>Lima elliptica v. leviuscula Jeffreys.</i> | 347 <i>Onoba striata v. distorta Marshall.</i> |
| 102 <i>Astarte sulcata v. incrassata (Brocchi)</i> | 355 <i>Galeodina carinata v. varicosa Marsh.</i> |
| 200 <i>Mya truncata v. abbreviata Jeffreys.</i> | 359 <i>Paludestrina stagnalis v. decollata Marshall.</i> |
| 201 <i>Sphenia binghami v. elongata Jeffr.</i> | 433 <i>Brachystomia rissoides v. alba Jeffr.</i> |
| 212 <i>Saxicava rugosa v. minuta (L.).</i> | <i>B. rissoides v. dubia Jeffreys.</i> |
| 215 <i>Pholas dactylus v. decurtata Jeffreys.</i> | 454 <i>Turbonilla lactea v. paullula Jeffreys.</i> |
| 216 <i>Barnea candida v. subovata Jeffreys.</i> | 489 <i>Buccinum undatum m. sinistrorsum.</i> |
| 219 <i>Pholadidea loscombiana v. aborta Jeffreys.</i> | <i>B. undatum m. carinatum Turton.</i> |
| 221 <i>Teredo norvegica v. divaricata Dsh.</i> | <i>B. undatum m. imperiale Reeve.</i> |
| 222 <i>T. navalis v. oclusa Jeffreys.</i> | <i>B. undatum m. acuminatum Brod.</i> |
| 223 <i>T. pedicellata v. truncata Jeffreys.</i> | 495 <i>Neptunea antiqua v. striata Jeffreys.</i> |
| 224 <i>T. megotara v. excisa Jeffreys.</i> | <i>N. antiqua v. gracilis Jeffreys.</i> |
| 265 <i>Dentalium entalis v. infundibulum Jeffreys.</i> | <i>N. antiqua m. contrarium L.</i> |
| 298 <i>Gibbula umbilicata v. pallens Duprey</i> | <i>N. antiqua m. acuminatum.</i> |
| 299 <i>Monodonta crassa v. minor Jeffreys.</i> | <i>N. antiqua m. scalariforme.</i> |
| 306 <i>Calliostoma occidentale v. pura Jeffr.</i> | <i>N. antiqua m. babylonicum Brocchi.</i> |
| 312 <i>Delphinoidea nitens v. alderi Jeffr.</i> | 508 <i>Ocenebra crinacea v. sculpta Jeffr.</i> |
| 326 <i>Lacuna parva v. clausa Jeffreys.</i> | 541 <i>Mangilia nebula v. abbreviata Jeffr.</i> |
| <i>L. parva v. plicata Marshall.</i> | 581 <i>Limacina retroversa v. jeffreysi F. & H.</i> |
| 331 <i>Littorina littorea v. turrita Jeffreys.</i> | |

LONDON BRANCH.—Annual Report.

During the past year seven meetings of this branch have been held, but the attendance has been very small. Owing to this it was found necessary to discontinue the evening meetings last winter. The field-meetings were not so successful as in some previous seasons.

23rd Sept, 1902.

J. E. COOPER, *Hon. Sec.*

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

"Monograph of the Land and Freshwater Mollusca of the British Isles,"
by J. W. TAYLOR, part 8, p. 1-52, pl. 1-5, Nov. 7, 1902.

The first number of vol. 2 of this important work commences to deal with species. It contains the *Testacella*, the three British (Oligocene) species of *Glandina* and *Limax maximus*. The system of treatment is very complete, consisting of the synonymy, history, characteristic features, description, reproduction, and development, food and habits, geological history, variation, and geographical distribution. Illustrations of peculiar or characteristic organs and variations of the shell are given throughout. With each species there are two maps, one shewing the recorded and the probable geographical range; the other, by three shades of colour, shewing the probable range, the recorded distribution, and the distribution verified by the authors within the British Isles; the comital areas are those propounded by the late Mr. H. C. Watson, and adopted by the Conchological Society for the compilation of its census. The value and interest of these maps cannot be overestimated. The *Glandinae* are very successfully illustrated by photography. The three *Testacella* and their varieties are illustrated by an excellent coloured plate.

The Nautilus, vol. 16, nos. 6 and 7, Oct. and Nov., 1902.

"*Helix* var. *circumcarinata* and *Pyramidula elrodi*," by R. E. C. STEARNS [synonyms]. "*Pyramidula elrodi* and *Epiphragmophora circumcarinata*," by H. A. PILSBRY [resemblance merely superficial]. "Contributions towards the knowledge of the Mollusca of Madagascar," by C. F. ANCEY [11 nn. spp. in *Helicarion*, *Euplecta*, *Hemiplecta*, *Macrochlamys*, *Helicophanta*, *Leucotanius*, *Clavator*, *Cyclostoma*]. "List of Land Mollusca from Sapporo, Japan," by H. A. PILSBRY and ADDISON GULICK [11 sp. recorded and one *nomen nudum*]. "*Unio popeii* Lea in New Mexico," by T. D. A. COCKERELL. "A new variety [*depressum*] of *Glyptostoma newberryanum*," by F. W. BRYANT. "The Manufacture of Pearl Buttons from Freshwater Mussels" [abstract from *Phila. Record*]. "*Cantharidus peronii* Phil.," by H. A. PILSBRY [specific name to stand as against *carinatus* Perry]. "*Angitrema verrucosa* at Lawrenceburg, Indiana," by A. C. BILLUPS.

"Dr. James G. Cooper," by W. J. RAYMOND [obituary notice]. "'Slugs' as Medicine," by G. H. CLAPP [dissolved in cocoa-nut milk for asthma]. "Notes on *Haliotis rufescens* Sw.," by H. HEMPHILL [South California and San Nicolas Island]. "Notices of New Japanese Land Snails," by H. A. PILSBRY and Y. HIRASE [7 nn. spp. in *Chloritis*, *Eulota*, *Pyramidula*, *Macrochlamys*, *Microcystina*, *Kaliella*]. "Note on *Neocorbicula* Fischer," by W. H. DALL [viviparous]. "*Pyramidula elrodi* and *Epiphragmophora circumcarinata*," by R. E. C. STEARNS [view that these are synonymous due to lack of material].

Journal of Malacology, vol. 9, parts 2 and 3, June and Sept., 1902.

"Notes on the British Species of *Buccinum*, *Fusus*, etc.," by J. T. MARSHALL [*F. gracilis* var. *glaber*, new to Britain; *F. propinquus* var. *levis* n.; *F. consimilis* n.sp.]. "A Classified List of the Helicoid Land Shells of Asia," by G. K. GUDE [Lists from various localities: Turkestan to Formosa]. "Description of a New Species of *Chloritis* [*C. (sulcobasis) prestoni*] from New Guinea," by G. K. GUDE. "On a Collection of Land and Freshwater Shells from Kelantan, Malay Peninsula," by E. R. SYKES [*Baysidia kelantanense* (sic), *Alycaeus kelantanense* (sic) nn. spp. figured]. "Is *Amalia carina*'a Risso a British slug?" by W. E. COLLINGE [request for material]. "On a Malformed Variety of *Limnaea pereger*," by H.

OVERTON [striped example with emarginate lip]. "Description of a New Species of *Separatista* [*S. benhami*] from New Zealand," by H. SUTER.

"On the Non-Operculate Land and Freshwater Mollusca collected by the members of the 'Skeat Expedition' in the Malay Peninsula, 1899-1900," by W. E. COLLINGE [*Streptaxis sykesi*, *S. striatula*, *Apoparmarion* n. gen. for *A. partridgei* n. sp., *Paraparmarion* n. gen. for *P. elongatus* n. sp., *Cryptosemelus* n. gen. for *C. gracilis* n. sp., *Hypselostoma laidlawi* n. sp., *Atopos sarasini*, *A. harmeri*, *A. nigosus*, *A. punctata*, *A. laidlawi* nn. spp., figured on pl. 4-6]. "Notes on some further Malformed Specimens of *Anodonta cygnea* L.," by H. H. BLOOMER. "A Classified List of the Helicoid Land Shells of Asia, part 3," by G. K. GUDE [Lists from different parts of Asiatic Russia; *Macrochlamys caligena* n. sp.].

Journal de Conchyliologie, vol. 50, no. 2, 1902 [received Dec. 9].

"L'organisation et les affinités des Gastéropodes primitifs d'après l'étude anatomique du *Pleurotomaria beyrichi*," by E. L. BOUVIER and H. FISCHER [with pls. 2-6]. "Remarques sur différentes espèces peu connues du genre *Achatina*," by C. F. ANCEY [with figs.].

The Naturalist, nos. 550-551, Nov. and Dec., 1902.

"*Limax cinereo-niger* in North Lancashire," by S. LISTER PETTY. "Shells at Hornsea Mere," by T. SHEPARD [8 spp. from the bed of an old mere]. "Lincolnshire naturalists at Scunthorpe," by the Rev. E. A. WOODRUFFE-PEACOCK [List of spp. noted].

The Irish Naturalist, vol. 11, nos. 10-12, Oct.-Dec., 1902.

"*Cæcilianella acicula* in Co. Kilkenny," by P. H. GRIERSON. "*Cæcilianella acicula* in Co. Dublin," by Miss A. L. MASSY.

The Annals of Scottish Natural History, no. 44, Oct., 1902.

"*Pupa anglica* in Midlothian (Forth Area)," by W. EVANS.

La Feuille des Jeunes Naturalistes, ser. 4, ann. 33, nos. 385-386, Nov.-Dec., 1902.

"Comparaison des faunes malacologiques terrestres de la Corse et de la Sardaigne" [Review of CAZIOR in *Assoc. Franc. Av. Sci.*, 1901]. "Note Malacologique," by E. M. [*Pupa sardoa* Cantraine allied to *P. granum* Drp.].

Records of the Australian Museum, vol. 4, no. 7.

"A New Australian Volute" [*V. perplicata*], by C. HEDLEY. "The Systematic Position of the Genus *Fossarina* A. Adams and Angas, and of *Fossarina varia* Hutton," by H. KESTEVEN [*Minos* syn. of *Fossarina*, which belongs to Trochidae; *Risellopsis* n. gen. for *F. varia*].

Proceedings of the American Philosophical Society, vol. 41, no. 169, April 1902.

"On the Molluscan Fauna of the Patagonian Tertiary," by H. VON IHERING [general observations; nn. spp. *Nautilus*, *Neonouramus* n. gen.].

Transactions of the Academy of Science of St. Louis, vol. 11, nos. 8 and 9.

"Some Interesting Molluscan Monstrosities," by F. C. BAKER [*Lampsilis* and *Unio*]. "Kinderhook Faunal Studies: III., the Faunas of Beds no. 3 to no. 7 at Burlington, Iowa," by S. WELLER [Lists of fossils].

"A Synopsis of the Genus *Streptaxis* and its Allies," by G. K. GUDE (*Proc. Malac. Soc.*, vol. 5, pt. 3) [Disposed thus: *Streptaxis*, sec. I., *Eustreptaxis*, 128 spp., II., *Discartemon*, 6 spp., III., *Artemon*, 19 spp., IV., *Stremmatopsis*, 5 spp., V., *Imperturbatia*, 4 spp., VI., *Colpanostoma*, 1 sp., VII., *Tayloria*, 3 spp., VIII., *Micrartemon*, 1 sp.; *Happia*, 13 spp.; *Scolodonta*, 17 spp.; pl. iv., containing hitherto unfigured species].

***Helix rotundata* Müll. m. sinistrorsum at Castleton, Derbyshire.**—On Whit-Monday, whilst collecting mollusca in the Winnatts, Castleton, Derbyshire, I had the good fortune to find a living reversed specimen of *Helix rotundata*. The typical form occurs in great numbers throughout the district, under the pieces of limestone lying about on the roads and lanes, and it was under one of these stones that I found this sinistral specimen. I have also taken a couple of the var. *alba* in the same district. It is surprising that, considering the vast numbers of this species throughout Europe, so few sinistral examples have been found. Mr. J. W. Taylor tells me that the only other records are: one specimen found by Canon Lett at Loughbrickland, Co. Down; another found by Mr. Alfred Sich in his garden at Chiswick; and a fossil specimen found by Dr. Loretz in tufaceous limestone in Coburg. In Adams' "Land and Freshwater Shells," 1896, both sinistral and scalariform examples of this species are classed under the head of "deformities." That a scalariform shell is a deformity I readily admit, but I fail to see how it applies to a sinistral one. In my reversed specimen the animal is also reversed, the openings of the generative and alimentary systems being on the left side and not on the right as is usual. In those genera which are normally sinistral, e.g., *Clausilia*, *Ariophanta*, *Draparnaldi*, etc., we do not consider them deformities any more than *Achatinella*, *Amphidromus*, etc., where, in some species, the proportion of sinistral and dextral individuals is about equal. Then, again, take *Neptunea antiqua*, rarely found other than dextral now, yet whose Red Crag ancestors were all sinistral—but surely not deformities! Personally, I do not like the term "monstrosity" either, as applied to reversed shells; it would be better to say "form."—JOHN W. JACKSON (*Read before the Society*, June 11, 1902).

***Paludestrina jenkinsi* near Eastbourne.**—On September 5th I paid a visit to a ditch at Litlington, a few miles out of Eastbourne, where last year I had taken some especially fine *Valvata piscinalis* and its beautiful albino variety. This year I found the ditch literally 'taken over' by *Paludestrina jenkinsi*. Conchologists acquainted with this species in its native haunts will know what I mean by 'taken over.' They line the sides of the ditch in myriads, though I did not observe a single specimen there last year. The *Valvata* I found dead on the mud at the bottom, or attached to caddis-cases. Next day I turned the couple of hundred *Paludestrina* that I brought away with me out of my jar of water into a shallow oblong dish of water preparatory to cleaning them, and left them for about half-an-hour. On my return I was surprised to find that they had formed a procession and were marching round the sides of the vessel just below the surface of the water, and every one going the same way (from left to right) with the exception of a very few which were still at the bottom of the dish in the middle. However, as soon as one of these reached the side it joined the procession. There was a complete chain of them round the dish, so that I could not discover which was leading. There was no fighting nor jostling; each kept a respectful distance from his neighbour. There was something very fascinating in watching this slow silent march round and round, and I can quite well understand how irresistible they would be if an army of millions and millions of these little molluscs were to determine to take possession of a ditch. I watched them for about an hour, when I had to disturb them to clean them, though I should much have liked to have seen how long the march would have continued. I hope to do so, however, on a future occasion. Other freshwater molluscs will often travel round a vessel of water, but I think always irregularly and independently of each other, while this seemed to be a regularly organised procession, either migratory or in search of food. The shells are large and clean, the keel varying considerably in height. It is a common species round Lewes.—ARTHUR G. STUBBS (*Read before the Society*, Sept. 10th, 1902).

THE LAND AND FRESHWATER SHELLS OF THE CHANNEL ISLANDS.

By J. R. BROCKTON TOMLIN, M.A. AND E. D. MARQUAND, A.L.S.

(Read before the Society, November 12, 1902).

THE following list embodies the result of our researches during many years past, chiefly in Guernsey and Alderney. It will perhaps serve as a convenient foundation-list to which additions can be made from time to time. The slugs of the smaller islands have hardly been touched, and it is more than probable that this branch of the subject would repay investigation. The Jersey records are mostly taken from two papers by Mr. E. Duprey.¹

The Channel Islands differ considerably in size. Jersey is nearly twice as large as all the others put together, having an area of sixty-two square miles. Guernsey has an area of twenty-four square miles, Alderney about four square miles, Sark a little less, Herm and Jethou still smaller. The rocks are chiefly igneous, but some ancient sedimentary strata occur in Jersey and Alderney. Guernsey consists of gneiss and quartz diorite, with a little granite. Sark is composed of gneiss and hornblende schist. No limestone occurs in any of the islands, but veins of calcite are found. The climate is exceptionally mild and equable, and the rainfall less than that of Devonshire and Cornwall.

The number of land and freshwater shells recorded for the Channel Islands in the present paper amounts to seventy-three species.

Testacella maugei Fér.—St. Saviour's Road, Jersey, of not infrequent occurrence (Duprey).

T. scutulum Sow.—Not uncommon in gardens in the vicinity of St. Peter-Port, Guernsey. Common in the Seigneurie grounds, Sark (Cooke & Gwatkin, as *T. haliotide*). In Guernsey the late Dr. Lukis was acquainted with *Testacella* as early as 1801, as it inhabited his garden at the time, and was afterwards discovered at the end of the valley in which his garden was situated (*J. Conch.*, vol. 5, p. 346).

Vitrina pellucida Müll.—Common, especially in Guernsey and Alderney. Our observations tend to show that these shells all belong to a form which is flatter and proportionately more elongate than the type—generally considered on the continent a distinct species, and figured by Clessin as the var. *elliptica* Brown.² A fine Guernsey specimen measures 6 mm. by 2·5 mm., and an Alderney one 6·5 mm.

Limax maximus L.—Jersey (Duprey). Guernsey, not infre-

¹ *Ann. and Mag. Nat. Hist.* (4) vol. 18, p. 338-345, 1876, and (5) vol. 11, p. 185-190, 1883.

² "Deutsche Excursions Mollusken Fauna," ed. 2, p. 70, 1884-5.

quent, especially at St. Martin's and St. Sampson's. Also in Alderney and Sark.

Var. **cellarius** D'Arg.—Common at St. Sampson's, Guernsey, and probably elsewhere.

Var. **mülleri** Moq.—St. Sampson's, rare.

L. arborum B.Ch.—Jersey (Duprey).

L. variegatus Drap. (= *flavus* Auct.).—Of occasional occurrence in Jersey, Guernsey, and Sark.

Agriolimax agrestis L.—Ubiquitous.

A. lævis Müller.—Jersey (Duprey). Guernsey, in damp ground.

Amalia gagates Drap.—Guernsey, common, especially in gardens.

Var. **rava** Wllms.—Equally common with the type.

Var. **plumbea** Moq.—With the others, occasional. Mr. Roebuck says of a reddish-brown example from St. Sampson's: "It is referable to no varietal name that I have met with."

A. marginata Drap.—Very common and universally distributed.

Hyalinia fulva Müll.—Jersey (Duprey).

H. cellaria Müll.—Everywhere plentiful, but it is often difficult to say where *cellaria* ends and *draparnaldi* begins. Probably the latter, according to English ideas, should only be ranked as a variety of the former.

H. draparnaldi Beck.—Common in Guernsey and Alderney, and often very fine, attaining a diameter of 17 mm. Jeffreys gives 12 mm. as that of *H. cellaria*.

Var. **albina** Moq.—Grande Mare, Guernsey, one specimen.

H. alliaria Mill.—Rather common, especially near the coast.

Var. **viridula** Jeffr.—With the type, occasional.

H. nitidula Drap.—Of general occurrence in all the islands.

Var. **helmii** Alder.—A single specimen at St. Saviour's, Guernsey.

H. pura Alder.—Scarce. Has only occurred in Guernsey at Moulin Huet, and at the foot of Clarence Battery.

H. radiatula Alder.—Jersey (Duprey). Sparingly in Guernsey on the south coast, and at the Vale. More plentiful in Alderney.

H. nitida Müll.—Jersey (Duprey). Guernsey, abundant at Cobo, and one specimen in Petit Bot Valley. Trois Vaux, Alderney.

H. crystallina Müll.—Jersey (Duprey). Guernsey, generally but sparingly distributed all along the south coast, especially at Moulin Huet and Saints' Bay. Alderney, rather rare.

Arion ater L.—Everywhere common. An adult from St. Sampson's, Guernsey, had a bright orange fringe and a deep yellow foot, the animal itself being drab-coloured. Mr. Roebuck says: "It is difficult to assign this specimen to any named variety, for it partakes of more than one, e.g., it is var. *marginata* by its fringe, but this added to the body-colour makes a variety for which there is no available name."

Var. **marginata** Moq.—St. Sampson's, Guernsey.

Var. **lamarckii** Kal.—A light form from Saints' Bay, Guernsey, was so named for us by Mr. Collinge.

A. hortensis Fér.—Common everywhere.

A. subfuscus Drap.—St. Sampson's, Guernsey.

A. circumscriptus Johnst.—St. Sampson's, Guernsey.

Helix rotundata Müll.—Common in Jersey, Sark, and Guernsey. Rather rare in Alderney.

Var. **minor** Jeffr.—Guernsey (Jeffreys).

Var. **pyramidalis** Jeffr.—Moulin Huet, Guernsey. Sark.

H. rupestris Drap.—Very rare in Guernsey. On walls at Grande Havre, Vale.

H. pygmæa Drap.—Jersey (Duprey). Guernsey, taken at Moulin Huet, Grande Mare, Bordeaux, King's Mills, and the Gouffre ; probably not uncommon, but easily overlooked. Clanque, Alderney.

H. aculeata Müll.—Jersey (Duprey). St. Andrew's, Guernsey ; one specimen in a decaying fungus.

H. aspersa Müll.—The type very abundant everywhere except in Sark, where the thin variety is quite predominant.

Var. **tenuior** Sh.—This is an extremely thin and transparent form, smaller and darker than the type, not found in England. It is particularly plentiful in Herm, Sark, on the cliffs of Alderney, and the south coast of Guernsey. Has not been recorded from Jersey, but no doubt it occurs there.

Var. **minor** Moq.—Rather common both in the typical and the *tenuior* form. A Herm specimen measures only 19 mm. each way, and one from Petit Bot Bay, Guernsey, and another from Clanque, Alderney, 21 mm.

Var. **conoidea** Pic.—Moulin Huet, Guernsey ; Braye Bay, and Mauney, Alderney. A small specimen of this variety measures 23 mm. in height by 19 mm. broad.

Var. **zonata** Moq.—Rare in Guernsey and Herm ; more common on the cliffs of Alderney.

Var. **exalbida** Mke.—Bordeaux Harbour, Guernsey, rare. One specimen near Fort Tourgis, Alderney.

Var. **virescens** Moq.—This occurred very rarely in 1887 to Mr. W. H. Heathcote and one of ourselves near Bordeaux Harbour, Guernsey. The shells were extremely thin and fragile, of moderate size, and of a beautiful light greenish colour after the animal had been extracted.

H. nemoralis L.—Common in all the islands, except Alderney, where it is rather rare ; usually with red or yellow ground colour ; a large specimen measures 23 mm. by 19 mm.

Var. **minor** Moq.—Very small specimens are rather frequent on the cliffs and downs by the sea. The smallest measurements we have taken are (Guernsey) 16·5 mm. by 12·5 mm., and (Alderney) 16·5 mm. by 14 mm.

Var. **conica** Pascal.—Bon Repos, Guernsey; the specimens are yellow 00300, and red 12345; one measures 16 mm. each way. Alderney, yellow 00000.

Var. **roseo-labiata** Tayl.—Fort Doyle, Guernsey. Alderney, on the cliffs.

Var. **bimarginata** Pic.—Pleinmont and Jerbourg, Guernsey. Also in Alderney and Sark.

Var. **carnea** R. & T.—Vazon, Guernsey, a single specimen with one slender band of darker shade than the ground colour.

Var. **rubella** Moq.—Common. The following band-formulæ are from Guernsey: 12345, 10345, 00345, 00300, 00000, 123(45), (123)(45), (12)3(45), 002300, 00300. In 00300 there is sometimes a whitish band below the black one. From Alderney: 12345, 00300, 00000. From Sark: 00300 with the other four bands translucent, (12345), 00(34)0.

Var. **libellula** Risso.—Common. The following forms are from Guernsey: 12345, 12345, 10345, 02345, 00345, 00305, 02300, 00300, 00000, 123(45), (12)3(45), 1(23)(45), (123)(45), 1(23)45, 1(2345), (12345), 00300. From Alderney: 00300, 00000, 12345, 123(45). The breadth of the band in 00300 varies from 1 to 3 mm.

Var. **olivacea** Gass.—Very rare, Moulin Huet, Guernsey; formula 00000.

Var. **petiveria** Moq.—Guernsey, 12345, 00300. Sark.

Var. **castanea** Moq.—Bordeaux Harbour, one specimen, 00000.

[**H. hortensis** Müll.—This has been recorded for Guernsey by Messrs. Cooke & Gwatkin, but we believe erroneously, as only dead shells were discovered. During a residence of several years in Guernsey, one of us searched for this species in vain; but dead shells of *H. nemoralis* var. *minor* with a bleached mouth, bearing a striking resemblance to *H. hortensis*, were occasionally found].

H. hispida L.—Ubiquitous. A Herm form has the suture deeply channelled (Cooke & Gwatkin).

Var. **subglobosa** Jeffr.—Fermain Bay, Guernsey (Cooke & Gwatkin).

Var. **conica** Jeffr.—St. Andrew's and Grande Mare, Guernsey. Apparently the prevailing form in Alderney.

Var. **albida** Jeffr.—St. Andrew's, Guernsey, one specimen with the type.

H. concinna Jeffr.—Jersey, dead only, with *Cyclostoma* (Duprey).

Guernsey, rather common at Clarence Battery, at Cobo, and near St. Andrew's Church.

H. revelata Mich.—Occurs in all the islands. In Guernsey, locally common on the cliffs, and also at Cobo. Rather frequent on the cliffs in Alderney. This species is best collected in dry weather, when it may be found at the foot of rocks that are closely edged with short thick grass and other vegetation; in wet weather it promenades freely, and from its colour is not very easy to detect.

H. pisana Müll.—Jersey, in St. Clement's Bay. Guernsey, extremely abundant and fine all round Vazon Bay, and in a less degree at Bordeaux Harbour. Does not occur in the other islands. The history of the introduction of this species into Guernsey has been told in detail by Dr. Lukis (*J. Conch.*, vol. 2, pp. 332-3), the evidence of his daughter, Mrs. Collings, decisively settling the question. The two localities in Guernsey produce very different forms: In the western habitat at Vazon, the shells are thick, strong, and well coloured, similar to those found at Tenby; whereas, on the eastern shore, at Bordeaux, they are much thinner and lighter coloured, with a considerable percentage of white ones.

Var. **albida** Moq. — Bordeaux Harbour and Vale Castle, Guernsey.

Var. **minor** Bourg.—Vazon, Guernsey, with the type. Average diameter, 15 mm., but we have found a perfectly-formed specimen measuring only 13 mm.

H. virgata DaCosta.—Abundant in all the islands, except Sark, where it appears to be confined to the hill above the harbour. On sandy flats by the sea the shells almost always belong to the small, conical form (*submaritima*). A young sinistral specimen was found alive at St. Sampson's, Guernsey, in 1891 (*J. Conch.*, vol. 7, p. 44).

Var. **submaritima** Desm.—Equally ubiquitous, and presenting most of the colour-variations of the type.

Var. **fasciata** Moq.—Abundant. This is what we usually consider the type.

Var. **subalbida** Poir.—Very common.

Var. **albicans** Grat.—Also very common.

Var. **leucozona** Tayl.—Common, but rather more local than the preceding. Abundant in Alderney. The prevailing colour is sometimes light-brown, instead of blackish; and in Alderney a form is not infrequent in which the white band is very slender or even altogether wanting, so that the shells, if found apart from connecting links, would certainly be ascribed to the var. *nigrescens* Grat.

Var. **rufula** Moq.—Reddish-yellow shells are locally common in Guernsey, which seem referable to this variety.

Var. **alba** Tayl.—Guernsey, plentiful near Bordeaux Harbour, and at Grandes Rocques. A very pretty white form with translucent bands.

Var. **hypozona** Moq.—Guernsey, rare. Alderney.

Var. **bifasciata** Bouch.—Cobo, Guernsey, and Alderney, rare.

Var. **tessellata** Bouch.—Lerée Bay, Guernsey; Alderney, in several places.

Var. **pellucens** Sh.—Extremely thin, transparent shells, which seem referable to this variety, occur near Doyle's Column, in Guernsey, and abundantly at Fort Grosnez, in Alderney. They form an interesting analogue to *H. aspersa* var. *tenuior*.

Var. **major** Tayl.—Alderney, rare; a specimen measures 16 mm. in diameter.

Var. **minor** Tayl.—Guernsey and Alderney.

H. caperata Mtg.—Generally distributed in all the islands, but usually of small size.

Var. **ornata** Pic.—With the type, but rare.

H. acuta Müll.—Very abundant in all the islands along the low-lying sandy coast-line. The following colour-variations are the prevailing ones:—

Var. **unifasciata** Moq.—The type form.

Var. **bizona** Moq.

Var. **strigata** Mke.

Var. **alba** Req.—Guernsey and Alderney, not common.

Var. **nigrescens** Tayl.—Guernsey, rare.

Var. **inflata** Moq.—Guernsey (Cooper):

Var. **articulata** Lamk.—Guernsey, frequent on the Vale coast. Alderney, not uncommon.

Var. **elongata** Cr. & Jan.—Sparingly at Fort Grosnez, Alderney.

H. pulchella Müll.—Jersey (Duprey & Cooper). Guernsey, not uncommon in damp ground at Vazon; sparingly at Moulin Huet, and on the Forest cliffs. Alderney, generally distributed and not rare.

Var. **costata** Müll.—Jersey (Duprey).

Buliminus obscurus Müll.—Jersey (Duprey). Guernsey, very rare, two living specimens found by us on the walls of Clarence Battery in 1886, and two others, near the powder magazine, by Mr. B. R. Lucas, in 1899. Also taken by Mr. Cooper.

Pupa anglica Fér. [= *ringens* Jeffr.].—Generally distributed all along the south coast of Guernsey in wet spots on the cliffs. In some places it occurs in extraordinary abundance, often accompanied by *V. antivertigo* (see *J. Conch.*, vol. 7, p. 44).

P. cylindracea DaC.—Very common in all the islands, especially near the sea.

Var. **edentula** Moq.—With the type at Vazon, and Bordeaux, Guernsey.

Var. **curta** West.—Generally distributed in Guernsey, Alderney, and Sark, intermixed with the type, and always connected with it by intermediate forms.

P. muscorum L.—Jersey (Duprey). Guernsey, not uncommon, but rather local; especially at Vazon Bay and Lancresse, under stones and amongst grass. Alderney, in many places, plentiful where found.

Vertigo antivertigo Drap.—Generally distributed along the southern cliffs of Guernsey, sometimes plentiful; common also in marshy ground at Cobo and Vazon Bay. Frequent under stones in all the cliff valleys in Alderney.

V. pygmæa Drap.—Jersey (Duprey). Guernsey, locally plentiful at Bordeaux Harbour and about Richmond; also taken at the Corbière and near King's Mills. Common under stones in Corbelets Quarry, Alderney, and at Clanque Bay.

V. edentula Drap.—Jersey (Duprey). Rare in Guernsey; Bordeaux, Petit Bot, and Saints' Bay.

Balea perversa L.—Jersey (Duprey). Guernsey, on mossy walls and tree trunks in all parts, but not common. Alderney, in several places; also in Sark.

Clausilia rugosa Drap.—Common in all the islands. The size is smaller on an average than that of English specimens, and decollate shells are not infrequent. An example from Clarence Battery has the last whorl disunited, exactly like some of the West Indian *Cylindrella*. The following varieties are of occasional occurrence with the type—

Var. **tumidula** Jeffr.

Var. **gracilior** Jeffr.

Var. **everetti** Miller.

Cionella lubrica Müll.—More or less common in Jersey, Guernsey, Alderney, and Sark.

Var. **fusca** Moq.—Occasional in Guernsey with the type.

Cæcilioides acicula Müll.—Jersey, in a garden (Duprey). Recorded for Guernsey by Jeffreys, but we have not met with it.

Succinea putris L.—Common in suitable spots in all the islands except Herm, but apparently all belonging to the variety below.

Var. **ferussina** Moq.—We have not seen anything like typical specimens of *S. putris*, and incline to doubt the existence of the type, at any rate in Guernsey and Alderney. Specimens of the prevailing form were called var. *ferussina* by Mr. Taylor of Leeds (see *J. Conch.*, vol. 4, p. 273), and with this determination we agree, after a careful study of the figures and descriptions in Baudon's "Monograph" (pp. 20, 21). There seems to be no difference except in size between this

and var. *charpentieri* Dum. As definite localities for this form in Guernsey, we may give Cobo, Ivy Castle, Moulin Huet, Grande Mare and L'Echelle mill-pond.

Var. **virescens** Mor.—Guernsey; identified by Mr. J. W. Taylor among some shells sent by us many years ago, but the exact locality was unfortunately not noted.

S. elegans Risso.—Guernsey, at Grosse Hougue Quarry, Ivy Castle, Bon Repos, and Albecq; specimens approaching var. *longiscala* Mor. at Moulin Huet. Longy Pond, Alderney, scarce.

S. oblonga Drap.—Jersey (Marshall), see *J. Conch.*, vol. 7, p. 414.

Carychium minimum Müll. — In suitable places in Jersey, Guernsey, and Alderney, often abundant.

Planorbis lineatus Walker.—Jersey (Duprey). Guernsey (Lukis).

P. nautilus L.—Jersey (Duprey). Very common in a few ditches on the Vale Road, Guernsey; one specimen with the last whorl disunited. Abundant in Longy Pond, Alderney.

Var. **crista** L.—With type in Guernsey and Alderney, plentiful, but not very well marked.

P. albus Müll.—Jersey (Duprey & Cooper).

P. spirorbis Müll.—Jersey (Duprey). A common species in Guernsey, but not seen in the smaller islands.

Var. **ecarinatus** Jeffr.—Very characteristic specimens of this scarce form were found in a ditch on the Vale Road, Guernsey, in 1884 (*J. Conch.*, vol. 4, p. 272). — Also plentiful in a quarry pool, at Spur Point, St. Sampson's, and at Cobo.

P. vortex L.—Guernsey, local; marshes near Ivy Castle, and in the Vrangue mill-pond. A specimen from the former locality measures 9 mm. in diameter, the average of the species being 5.5 mm.

[Two other species of *Planorbis* occur in Guernsey, but they are not indigenous. **P. corneus** thrives in a small fish-pond at St. George, where they were introduced some twenty years ago by the proprietor; and **P. parvus** used to be found plentifully in an artificial pond in a garden at Ruettes Brayes, in which water-plants of many kinds, British and foreign, were grown. The latter species may possibly spread to other parts of the island].

Physa hypnorum L.—Jersey (Duprey & Cooper). Guernsey, generally distributed throughout the low-lying districts, and in some pools abundant.

Limnæa peregra Müll. — Of universal occurrence in ponds, streams, etc., in Jersey and Guernsey; apparently absent in Sark. At Longy Pond, Alderney, there is found in abundance a very small dark-coloured form which does not correspond with any described variety we know of.

Var. **ovata** Drap.—Guernsey, at Ivy Castle, and near Fort Doyle.

Var. **inflata** Kobelt.—Abundant and fine in a mill-pond in Talbot's Valley, Guernsey.

Var. **solemia** Zgl.—This distinct and much more swollen form occurs at Cobo, Guernsey. It is also known from Preston and Southport, Lancashire.

Var. **intermedia** Fér.—Cobo, Guernsey.

Var. **fontinalis** Stud. [=var. *pulchella* Garn.].—Pool towards Grandes Rocques, Guernsey, scarce.

Var. **maritima** Jeffr.—According to Messrs. Cooke & Gwatkin this form is widely distributed, but we have only found characteristic specimens in a small tank in Herm, the shell being very solid, small, with a large mouth. The race varied considerably in four consecutive years (1884-7), and the last lot, procured in 1887, are apparently tending towards a dwarf form of the type, with quite thin shells.

L. palustris Müll.—Not uncommon throughout the northern half of Guernsey, especially about the Vale, where the form is rather stumpy and deeply-coloured inside, being perhaps referable to var. *tincta* Jeffr.

Monst. **decollatum** Jeffr.—Guernsey (Lukis).

L. truncatula Müll.—Jersey, Guernsey, and Alderney, not uncommon in suitable places.

Var. **elegans** Jeffr.—Grande Mare, Guernsey, very fine.

Var. **minor** Moq.—Saints' Bay Valley, Guernsey.

L. glabra Müll.—Jersey (Duprey). Guernsey, common in 1877 in ditches near Ivy Castle (Cooke & Gwatkin). In 1884 this locality was searched in company with Professor Gwatkin, and again on subsequent occasions, but no trace of *L. glabra* was discoverable. It seems to have entirely died out in that station, and possibly the species is now extinct in Guernsey.

Var. **elongata** Jeffr.—Jersey, living with the type, but having a blunter apex (Duprey).

Ancylus fluviatilis Müll.—Jersey, Guernsey and Alderney, common in streamlets. Port du Moulin, Sark (Cooke & Gwatkin). Mr. Duprey has more than once found it in Jersey, attached to the active flying water-beetle, *Acilius sulcatus*, thus showing how a slow, sedentary mollusc may be quickly distributed over the country.

Var. **gibbosa** Bourg.—Sark (Jeffreys).

Var. **albida** Jeffr.—Guernsey, scarce in a spring at Fermain; plentiful under a small waterfall at Bon Repos.

A. lacustris L.—Marshes near Ivy Castle, Guernsey (Cooke & Gwatkin).

Cyclostoma elegans Müll.—Once found in Jersey at high-water mark after a spring-tide, by Mr. Duprey, dead and empty, but with the operculum *in situ*. He thinks that this and other species of land-shells which occurred with it may have been drifted over by currents from the opposite French coast. This species is recorded by Jeffreys for Alderney, but we know not on whose authority. We have found on Rochers Hill, Alderney, two dead specimens which had fallen out of a sand-bank quite a hundred feet above the sea level, one of which had the operculum *in situ*; so that *Cyclostoma* must have lived in the island at one time, but it is not to be found there alive now.

Hydrobia ventrosa Mtg.—Alderney, one specimen in shell-sand on the sea-shore, probably washed in from the French coast.

Var. **elongata** Jeffr.—Very abundant in Arnold's Pond, Guernsey, and in salt-water ditches running inland from Bordeaux Harbour; also abundant at Mare de Carteret, near Cobo. Decollate specimens are frequent (var. *decollata* Jeffr.). Under *H. ulvæ* ("Brit. Conch.," vol. 4, p. 53) Jeffreys records a var. *octona* from Arnold's Pond, but we have never found material for differentiating such a form, the description of which, moreover, reads uncommonly like that of *H. ventrosa*. Specimens do occur which show some approximation to typical *H. ventrosa*, with shallower suture and shorter spire.

Neritina fluviatilis L.—Two dead specimens found on the shell-beach at Alderney, probably washed in from the coast of France.

Sphærium corneum L.—A small variety of this species is common in ditches behind Ivy Castle, Guernsey.

S. lacustre Müll.—Plentiful in a road-side pool at Lanresse, Guernsey.

Pisidium fontinale Drap.—Jersey (Duprey).

P. pusillum Gmel.—Jersey (Duprey). Guernsey, near Ivy Castle, and in Talbot's Valley. Alderney, at roots of plants in many of the cliff streamlets. Sark, in a pond near the harbour (see under *P. milium*).

P. nitidum Jen.—Jersey (Duprey). Guernsey, common at Cobo and near Ivy Castle; Grande Mare, one specimen.

P. milium Held.—Guernsey, very rare near Ivy Castle. Incorrectly noted by Cooke & Gwatkin as found in a small pond in Sark near the harbour. Specimens from the same pond in 1884 proved to be *P. pusillum*, incrustated with a ferruginous deposit which may have led to the error. Messrs. Cooke & Gwatkin quite admitted the possibility of an error in identification. The pond was small and was thoroughly searched in 1884. There is, therefore, no doubt whatever that the *P. roseum* of *J. Conch.*, vol. 2, p. 321 = *P. pusillum* of the same *Journal*, vol. 4, p. 271.

NOTES ON THE LAND AND FRESHWATER MOLLUSCA OF EAST SUFFOLK.

By ARTHUR MAYFIELD.

(Read before the Society, December 10, 1902).

THE following list of land and freshwater mollusca is the result of five years' shell-hunting in that part of Suffolk east of the line of longitude 1° E. of Greenwich. My researches have been confined to three areas, distinct from each other both in situation and character. These are :—(1). The neighbourhood of Lowestoft in the north-east corner of the county, including the cliffs and grassy denes by the sea, the freshwater lake called Oulton Broad, and the surrounding marshlands. (2). The neighbourhood of Mendlesham near the middle of the county, an upland and purely agricultural district, on a sub-soil of dirty greyish clay. Here is no permanent stream of water, but the ponds, moats, and ditches contain a good number of freshwater species. (3). The valley of the Gipping and Orwell from Needham Market to Felixstowe. At Needham and Bramford, the upper chalk forms the sub-soil in places.

Two species, viz., *Dreissensia polymorpha* and *Testacella haliotideae*, which have been recorded for East Suffolk, I have not yet met with. The ninety-three species hereafter enumerated have, with the one exception of *Vertigo minutissima*, come under my own notice.

Arion ater (L.).—(1), Oulton. (2), Mendlesham, Wetheringsett, Thornham, Brockford. (3), Sproughton, Needham Market.

Var. **rufa**.—(3), Needham Market.

A. minimus Simroth.—(2), Mendlesham, Brockford, Thwaite.

A. hortensis Fér.—(1), Lowestoft. (2), Mendlesham, Wickham Skeith, Brockford. (3), Needham Market.

A. circumscriptus Johnst.—(2), Mendlesham, Thwaite. (3), Needham Market.

Amalia sowerbyi (Fér.).—(2), Mendlesham. (3), Bramford.

Limax maximus L.—(1), Lowestoft, Oulton. (2), Mendlesham, Brockford. (3), Ipswich.

L. flavus L.—(2), Mendlesham, Brockford. (3), Ipswich.

L. marginatus (Müll.).—Rare. (2), on willows at Mendlesham and Wetheringsett.

Agriolimax agrestis L.—Common everywhere.

A. lævis Müll.—(1), Oulton. (2), Mendlesham, Thwaite. (3), Needham Market, Sproughton.

Vitrina pellucida (Müll.).—(1), Lowestoft, Gunton. (2), Mendlesham, Wickham Skeith, Thwaite. (3), Bramford.

Hyalinia cellaria (Müll.).—Common in all districts.

H. glabra (Studer).—(2), plentiful at Mendlesham.

H. alliaria (Müller).—Rare. (2), Vicarage plantation, Mendlesham.

H. nitidula (Drap.).—Very common in districts (2) and (3).

H. radiatula (Alder).—(1), Lowestoft. (2), Mendlesham and Wickham Skeith.

H. pura (Alder).—(2), Mendlesham, Thornham. (3), Bramford, Sproughton.

H. crystallina (Müll.).—(1), Oulton, Gunton. (2), Thwaite, Mendlesham, Thornham, Wickham Skeith. (3), Bramford.

H. fulva (Müll.).—(2), Mendlesham. (3), Bramford.

H. nitida (Müll.).—(1), Near Lake Lothing, Lowestoft. (3), Needham Market, Sproughton.

Helix rotundata Müll.—(1), Lowestoft. (2), Mendlesham (very plentiful), Brockford, Thwaite, Wickham Skeith. (3), Ipswich.

H. pygmæa Drap.—(1), Gunton. (2), Mendlesham, Wetheringsett. (3), Needham Market, Bramford, Creting.

H. aculeata Müll.—(1), Gunton. (2), Mendlesham. (3), Ipswich.

H. pulchella Müll.—(2), Mendlesham. (3), Bramford, Coddendam, Needham Market.

H. lapicida L.—(2), Mendlesham. (3), Needham Market and Bramford.

H. aspersa Müll.—Very common everywhere.

Var. **flammea**.—A common form in all districts.

Var. **zonata**.—Mendlesham.

H. nemoralis L.—Common in districts (1) and (3), more sparingly in (2).

Var. **libellula**.—Mendlesham, Lowestoft, Needham Market.

Var. **rubella**.—Mendlesham, Coddendam.

H. hortensis Müll.—More common than the preceding on the clayey soils.

Var. **albina**.—Mendlesham, Creting.

Var. **lutea**.—Mendlesham, Needham Market.

Var. **arenicola**.—Mendlesham, Needham Market.

Var. **incarnata**.—Mendlesham.

Var. **olivacea**.—Mendlesham.

H. arbustorum L.—(1), Oulton and Somerleyton.

H. cantiana Mont.—(1), Lowestoft. (3), Needham Market, Coddendam.

H. cartusiana Müll.—There is a flourishing colony of this species on a chalky hedge-bank at Needham Market.

H. rufescens Penn.—(1), Lowestoft. (2), Mendlesham. (3), Needham Market, Creting, Coddendam, Ipswich.

H. hispida L.—The typical form is rare. (3), Creeting.

Var. **hispidosa**.—Very common everywhere.

Var. **depilata**.—Mendlesham.

Var. **albida**.—Creeting.

H. granulata Alder.—In osier beds at Stowmarket and Needham Market.

H. itala L.—Fairly common in all districts.

Var. **leucozona**.—Mendlesham, Needham Market.

Var. **minor**.—Mendlesham, Creeting.

Var. **alba**.—Needham Market.

H. caperata Mont.—(1), Lowestoft, Pakefield. (2), Mendlesham, Wickham Skeith. (3), Creeting, Needham Market.

Var. **ornata**.—On the high road, at Creeting, Needham Market.

Var. **fulva**.—Needham Market, Creeting.

Var. **major**.—Creeting.

H. virgata DaCosta.—Fairly common throughout the county, but not abundant on the clayey soil of district (2). Very abundant at Lowestoft.

Var. **carinata**.—Mendlesham, Lowestoft.

Var. **submaritima**.—Lowestoft.

Var. **subalbida**.—Mendlesham, Lowestoft, Needham Market.

Var. **alba**.—Lowestoft.

Var. **albicans**.—Lowestoft, Mendlesham, Coddtenham.

Var. **subglobosa**.—Lowestoft.

Buliminus obscurus (Müll.).—(2), Mendlesham, Earl Stonham, Wickham Skeith. (3), Creeting, Bramford.

Pupa cylindracea (DaCosta).—(2), Mendlesham. (3), Ipswich, Bramford.

P. muscorum (L.).—(1), Lowestoft. (2), Near Landguard Fort, Rushmere Heath, near Ipswich.

Vertigo antivertigo (Drap.).—Near Lake Lothing, Lowestoft.

V. pygmæa (Drap.).—(1), Lowestoft. (2), Mendlesham, Wetheringsett.

V. substriata (Jeffr.).—(2), Thornham.

V. pusilla Müll.—(2), Thwaite.

V. edentula (Drap.).—(2), Plentiful in Mendlesham churchyard.

V. minutissima (Hartm.).—A single specimen in my possession was found by Mr. A. A. Moore, of Norwich, on the wall of Burgh Castle, near Great Yarmouth.

Balea perversa (L.).—(2), Mendlesham, Wickham Skeith.

Clausilia perversa (Pult.).—(1), Gunton. (2), Mendlesham, Wickham Skeith, Thwaite. (3), Needham Market, Bramford.

C. laminata (Mont.).—(2), Not uncommon at Mendlesham.

Azeca tridens (Pult.).—Plentiful in district (2), Mendlesham, Wickham Skeith, Thwaite.

Cochlicopa lubrica (Müll.).—(1), Carlton Colville. (2), Mendlesham, Wickham Skeith, Thwaite. (3), Creeting, Needham Market, Ipswich.

Cæcilioides acicula (Müll.).—Among rubbish in the bed of a dried-up ditch at Mendlesham.

Succinea putris (L.).—(1), Oulton. (2), Mendlesham, Wickham Skeith, Brockford, Thwaite. (3), Needham Market, Ipswich, Sproughton, Bramford.

S. elegans (Risso).—(1), Oulton. (2), Brockford, Thwaite. (3), Needham Market.

Carychium minimum Müll.—Very common in all districts.

Segmentina nitida (Müll.).—(3), In a pond at Needham Market.

Planorbis fontanus (Lightfoot).—(2), Mendlesham, Wetheringsett. (3), Needham Market, Bramford.

P. nautilus (L.).—(2), Mendlesham.

P. vortex (L.).—1, Oulton. (3), Needham Market, Bramford, Ipswich.

P. spirorbis Müll.—Very abundant in district (2), Mendlesham, Wickham Skeith. (3), Needham Market.

P. carinatus Müll.—(1), Oulton. (3), Needham Market, Bramford, Ipswich.

P. umbilicatus Müll.—(2), Mendlesham. (3), Needham Market, Bramford, Sproughton.

P. corneus (L.).—(1), In a ditch near Oulton Broad.

P. contortus (L.).—(1), Lowestoft, Oulton. (3), Needham Market, Bramford.

P. albus (L.).—(1), Oulton Broad. (2), Mendlesham. (3), Needham Market, Sproughton.

Aplexa hypnorum (L.).—In stagnant pools. (1), Gisleham. (2), Mendlesham (very abundant).

Physa fontinalis (L.).—1, Oulton. (3), Needham Market, Bramford, Sproughton, Ipswich.

Amphipeplea glutinosa (Müll.).—(3), Two specimens in a broad ditch at Needham Market.

Limnæa peregra (Müll.).—Common everywhere. In district (2), where the ditches are almost dry in summer, a small variety and specimens much produced in the spire are common.

L. auricularia L.—(3), In the Gipping at Sproughton and Bramford.

L. stagnalis (L.).—(1), Lowestoft, Oulton. (2), Mendlesham, Thwaite. (3), Needham Market, Bramford, Ipswich.

L. palustris (Müll.)—(1), Lowestoft. (3), Needham Market, Bramford.

L. truncatula (Müll.).—(2), Very abundant at Mendlesham and Thwaite. (3), Needham Market.

Ancylus fluviatilis (Müll.).—(3), On water-lily leaves at Bramford and Needham Market.

Velletia lacustris (L.).—(2), On leaves of pond-weed, Mendlesham. (3), On water-lily leaves at Ipswich.

Cyclostoma elegans (Müll.).—(3), Abundant on a chalky bank at Bramford.

Var. **ochroleuca**.—Bramford.

Acicula lineata (Drap.).—(1), One specimen, Oulton.

Neritina fluviatilis (L.).—(3), In the Gipping, Bramford.

Viviparus contectus (Millet).—(1), Oulton Broad.

V. viviparus (L.).—(1), In a ditch near Oulton Broad. (3), Ipswich, Bramford.

Bythinia tentaculata (L.).—(1), Oulton. (3), Needham Market, Bramford, Ipswich.

B. leachii (Sheppard).—(3), Needham Market, in the Gipping.

Valvata piscinalis (Müll.).—(1), Oulton, Lowestoft. (3), Needham Market, Sproughton.

V. cristata Müll.—Very common in all districts.

Unio pictorum (L.).—(1), Near Oulton Broad.

Anodonta cygnea (L.).—(1), Oulton Broad. (2), Thorndon. (3), Ipswich, Needham Market.

A. anatina (L.).—(1), Oulton Broad.

Sphærium corneum (L.).—(1), Lowestoft, Oulton. (2), Mendlesham. (3), Bramford, Needham Market.

S. lacustre (Müll.).—(2), In ponds, Mendlesham.

Psidium amnicum (Müll.).—(1), Oulton. (3), Needham Market, Bramford.

P. fontinale (Drap.).—(1), Near Lake Lothing, Lowestoft. (2), Mendlesham.

Var. **pulchella**.—Lowestoft.

P. pusillum (Gmelin).—(2), Mendlesham, Thwaite, Wickham Skeith.

P. milium Helder.—(1), Near Lake Lothing, Lowestoft. (2), Mendlesham.

Helix pisana var. **alba** Shuttl. in Guernsey.—In July this year I found some of this scarce variety at Vazon Bay, Guernsey. With this exception the colony of *Helix pisana* at that locality seemed to consist entirely of the typical form. On the other hand, at Vale Castle and Bordeaux Harbour (the only other known localities in Guernsey for this *Helix*) there is a fair proportion of the variety *albida* Moq. with the type.—J. E. COOPER, 68, North Hill, Highgate, N. (*Read before the Society*, November 12, 1902).

THE ASSOCIATION OF *HELIX NEMORALIS* AND *HELIX HORTENSIS*.

BY THE REV. S. S. PEARCE, M.A., Long Combe Vicarage, Woodstock, Oxon.

(Read before the Society, December 10, 1902).

DURING the last twenty years in which I have been interested in our land and freshwater molluscs I have only taken the two species in association together at the five undermentioned localities.

1. On the chalk downs among furze bushes above Paradise Wood, near Eastbourne, East Sussex, April, 1884. Formation: Middle chalk. *Helix nemoralis* occurs here in hundreds and associated with a very few *H. hortensis*. The shells are for the most part 12345, and though of the colour forms v. *libellula* and v. *lutea* respectively, the yellow in each species is practically lost the shells having a white bleached appearance. I may add that in the Eastbourne and Lewes districts of Sussex both species are plentiful, but confined to their respective habitats; *H. nemoralis* is chiefly found on the downs and in woods on their flanks, whereas *H. hortensis* keeps to the hedges, etc., of the lower lands such as Pevensey levels.

2. By the side of a track or green lane leading up to Boniface Down from Shanklin old church, I. of W. Both species were taken together, with several examples of *H. arbustorum*. This is the only case of association I can record in the island, though I know the whole of it very well, and both species abound in distinct localities. Formation: Lower chalk. Date, August, 1881.

3. Outside the village of Yelverton, near Norwich, in a lane leading to the latter city, the two species were associated together in a living state in considerable abundance. *Helix nemoralis* predominated in all its commoner forms of v. *libellula* and v. *rubella*; *H. hortensis* was confined to its varieties *lutea* 00000 and a few 12345. Formation: Glacial drift. Date, several occasions between September, 1889 and December, 1890.

4. I submit also the following evidence as to the association of the two species. In July, 1901, an unfrequented lane at Goodrington, between Paignton and Totnes, S. Devon, yielded the following numbers of recent bird-eaten *H. nemoralis* and *H. hortensis* inextricably mingled together with a few examples of *H. aspersa*. The numbers taken were *H. nemoralis* 31, *H. hortensis* 403. Formation: ? Date, July 15 and 16, 1901.

5. A collection of shells of *H. nemoralis* and *H. hortensis* recently broken by birds for food taken at the foot of limestone cliff at Anstey's Cove, S. Devon. Date, July 29, 1901. *Helix nemoralis* largely

predominates over the other species in the Tor Bay district, the numbers taken being *H. nemoralis* 136, *H. hortensis* 34.

The foregoing then are the occasions when I have myself during a considerable number of years noticed the actual association of the two species. The cases of association appear to be so rare, or at any rate have been so infrequently recorded by others, that we may safely conclude that as a rule the two species live in separate and distinct, though not always (and this is the puzzle to my mind) in different kinds of habitats. As far as our own country is concerned it is difficult to suggest any explanation as to the tendency of these snails to inhabit separate localities with only occasional overlapping.

Turning to the continent, I have observed one or other or both of the species in many places, in France (N.W., W. and S.E.) without association; in Switzerland (W. and Central) without association; and in Italy (N.) where I have only taken *Helix nemoralis*. *H. hortensis* is, I believe, recorded from the north of Italy, but it seems to me that the white lipped variety of *H. nemoralis*, which is not uncommon in Lombardy, has perhaps been mistaken for *H. hortensis*.

In the vicinity of the Alps, however, I think there are facts which to my mind tend to demonstrate that, among other circumstances, that of altitude has a voice in determining the range of the two species. For instance while staying near Geneva in 1895 on the Grande Salève mountain, which rises to some 4,600 feet, I found *H. hortensis* abundantly on loose stone walls and under heaps of stones at a level of 3,500 feet and upwards in company with *H. arbustorum*, *H. sylvatica*, *H. lapicida* and other smaller forms. *H. nemoralis* on the other hand does not reach higher than 2,340 feet, at the height of the village of Monnétiér where I took a few examples. Thence downwards it increased in abundance, abounding on every tree, wall and hedge between 2,000 feet (about) and the level of the Lake of Geneva.

Apparently the same tendency of *H. hortensis* to reach higher parts than *H. nemoralis* is observable in Central Switzerland; at Berne, *H. nemoralis* is plentiful, but at Thun (1,850 feet, about 150 feet above Berne) *H. hortensis* appears only, as far as I know, and proceeding up the valley from Thun to Interlaken (1,857 feet) past Brienz (1,857 feet) on to Meiringen (1,970 feet) and up the Brunig Pass (3,396 feet) *H. hortensis* is found exclusively, though not abundantly. Perchance some of your correspondents may be able to give some precise information as to the distribution of *H. hortensis* in the Alps.

The Rev. J. W. Horsley in this *Journal* (vol. 7, p. 34) gives an interesting instance of the intrusion of *Helix nemoralis* into the valley of Meiringen.

THE ASSOCIATION OF *HELIX NEMORALIS* AND *H. HORTENSIS* IN IRELAND.

BY R. WELCH.

(Read before the Society, December 10, 1902).

Helix nemoralis is a common species in almost every county in Ireland. *H. hortensis*, on the contrary, is very local and usually rare. In the four localities in which I have found the latter the geological formation differed very much. Quartzites in N.W. Donegal (Portsalon), Ordovician (really capped with Boulder Clay) in Co. Down (Downpatrick), and Carboniferous Limestone at Ardraccan, near Navan, and Kells, both in Co. Meath.

1. Portsalon.—*H. hortensis* is excessively local in a damp ditch with a hedge above it. The molluscs shelter in the damp grass roots of the ditch in dry weather, in wet, swarm all over the hedge. I saw no *H. nemoralis* with them on any of my visits, nor did I see any *H. hortensis* with the former which are plentiful all over the sea-bluffs, not more than 200 to 250 feet away, with *Helix aspersa*. *H. hortensis* does not seem to spread to the adjoining dunes with their short turf, while *H. nemoralis* does, the latter being a sand-dune species in Ireland or very largely so.

2. Downpatrick.—Both species occurred together in the cathedral graveyard. *H. hortensis* is very rare outside, but predominates inside the walls. I only found two forms at any time, 12345 and 00000, both var. *libellula*, with an occasional tendency to 12345. On approaching dry weather *H. hortensis* seems to hurry to damp shelter more quickly than the other species.

3. Ardraccan.—Old graveyard, near Navan, Meath. *H. hortensis* swarms here in wet weather all over the tombstones and rank vegetation, with a few of the other species. In dry weather not a trace of it is to be found unless after careful search in damp corners, at bottom of tombstones and grass roots, etc. I agree with Mr. Pearce that where one species is plentiful the other is rare or absent and I only know one place in Ireland (Maghera, W. Donegal) where a hybrid race may possibly be present, though I doubt even that. The plentiful food supply and moisture of these old Irish graveyards seems to suit *H. hortensis* very well. *H. nemoralis* can exist in much dryer and less sheltered situations, even on our wind-swept dry dunes, where *H. hortensis* does not occur, notwithstanding some false records by visitors to Ireland. The small delicate white lipped *H. nemoralis* so plentiful in some north-western dunes has been mistaken for *H. hortensis*.

4. **Kells, Co. Meath.**—Old graveyard. Both species occur here, though *H. hortensis* is not nearly so plentiful as at Ardraccan. The graveyard is larger but vegetation is not so rank, the grass is shorter and there is less shade from trees. *H. nemoralis* on the whole is more plentiful here than *H. hortensis*.

On the whole the species occur together in Ireland where the area in which they live is restricted, and *Helix hortensis* thrives best in a situation offering more moisture than the other seems to require, either for feeding or æstivation during dry spells.

In the Natural History Museum, Dublin, there are specimens of *H. hortensis* from a few other Irish localities, which I have not visited as yet.

Surrey and Sussex East Records.—I have pleasure in transmitting to the Society the following records in connection with the authentication scheme. They are based upon collections made during the years 1900 and 1901 by my young friend, Mr. Russell Harrison, of Foulser Road, Upper Tooting, S.W. According to the latest census list (Taylor and Roebuck in Williams' "Land and Freshwater Shells," third edition) the five records are new for their respective vice-counties. Mr. Harrison wishes the accompanying voucher specimens to be laid before the Society, and accepted for its Cabinet:—Sussex, East, v.c. 14, *Helix lapicida* L., Silverhill, near Hastings, 1901; Surrey, v.c. 17, *Unio tumidus* Phil., Bank of Thames, at Kew, 1900, *Neritina fluviatilis* L., Bank of Thames, at Kew, 1900, *Bythinia leachi* Shepp., Collier's Wood, near Merton, 1901, *Planorbis nautileus* L., ditch in Richmond Park, 1900.—WILLIAM WHITWELL, F.L.S., Dec. 16, 1901 (*Read before the Society*, March 19, 1902).

Notes on the Miller's Dale Ramble, August 9th, 1902.—The chief attraction of this ramble was the taking of the small subterranean species, *Cecilioides acicula*. To Mr. T. Hey, of Derby, must be given the credit of first discovering the locality of this interesting species (*J. Conch.*, vol. 6, p. 122). The habitat is the overgrown talus at the foot of a series of carboniferous limestone cliffs. Amongst the larger masses of rock projecting from the surface, species such as *Clausilia perversa*, *Buliminus obscurus*, *Pupa cylindracea*, *Carychium minimum*, *Helix pulchella*, *H. rupestris*, *H. rotundata*, *H. hispida*, *Vitrina pellucida*, and various *Hyalinix* occur in abundance. Underneath the surface rocks is a deep layer of disintegrated débris mixed with decayed vegetable matter, and it is amongst this that the *C. acicula* occur, burrowing to depths varying from six inches to a couple of feet. Dead shells are numerous with about an equal proportion of living individuals, and a nice series may be obtained without much difficulty. A fairly numerous colony of *Helix hortensis* was found, chiefly typical, with a few of the shells showing coalescent bands. Typical examples of *H. nemoralis* were not found, the prevalent forms being *rubella* and *libellula* with one band. *H. arbustorum* and its varieties *flavescens* and *cincta* were extremely abundant, but very few *H. lapicida* were observed. *Arion ater*, *Agriolimax agrestis* and *A. lævis* were the only slugs noted.—J. W. JACKSON (*Read before the Society*, Sept. 10th, 1902).

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

316th Meeting, January 14, 1903.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

Journal of the Marine Biological Association of the United Kingdom, an almost complete series from vol. 1 to date (*from the Association*), and the usual Periodicals received in exchange.

New Member Elected.

S. Pace, Marine Biological Laboratory, Plymouth.

Candidate Proposed for Membership.

D. Thaanum, 5, Church Street, Hilo, Hawaiian Islands.

Resignations.

Mrs. Brierley, Mrs. Evans ; W. Bendall, R. A. Phillips, T. Sparkes.

Papers Read.

"A List of British Non-Marine Mollusca," by B. B. Woodward.

"*Vertigo heldi* Clessin in Ireland," by Brockton Tomlin.

"The Relation of Fish to *Paludestrina jenkinsi*," by J. D. Dean.

Exhibits.

By Mr. C. H. Moore : A fine series of *Vertigo alpestris* from Holker, Lancashire ; and a set of *Helix hortensis* and *H. nemoralis*, the former of the typical form and var. *lutea* only, and the latter showing great variety of banding and colour—found living in company at Dysart, North Wales.

By Mr. F. Taylor : *Vertigo substriata* from Romiley, a first record for that district ; *Helix nemoralis* var. *roseozonata*, Keighley, Yorkshire ; and a curious variety of *Limnea palustris* from Dukinfield Canal ; this form appears to be identical with the shell discovered last year in this locality by himself and Mr. J. W. Jackson, and thought to be *L. bulimoides* Say.

By Mr. R. Standen : Some very beautiful examples of *Cardium pectinatum* L. and *C. lyratum* Sow., recently added to the Manchester Museum collection.

An interesting exhibit of British *Clausilie*, from a large number of localities, was made by Messrs. E. Collier, E. C. Stump, C. H. Moore, B. R. Lucas, and J. W. Jackson.

317th Meeting, February 11th, 1903.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

"Mollusca," and other articles from *Encyclopedia Britannica* ; "Report on the Testaceous Mollusca of the Gulf of Suez," by R. Macandrew ; "Millport Marine Biological Station, Communications I.," ; "Catalog der Conchylien-Sammlung," by Fr. Paetel ; "Catalogue des Mollusques de l'Ile de la Réunion (Bourbon)," by G. P. Deshayes ; "Presidential Addresses to the Malacological Society of London," by G. B. Howes and H. Woodward ; "Pearl and Chank Fisheries of the Gulf of Manaar," by Edgar Thurston ; "The Crag Mollusca," by Searles V. Wood (*from Mr. R. D. Darbishire*) ; and the usual periodicals received in exchange.

New Member Elected.

D. Thaanum, 5, Church Street, Hilo, Hawaiian Islands.

Candidates Proposed for Membership.

George Abbott, Alexander Street, Kettering.

W. Charles Cattell, The Poplars, Montagu Street, Kettering.

Resignation.

E. Tulk-Hart.

The Statement of Accounts

FOR THE YEAR ENDING DEC. 31, 1902,

having been signed by the Auditors, was laid before the Meeting.

[illegible]

Papers Read.

"*Vertigo alpestris* at Holker, Lancs.," by C. H. Moore.

"A Correction," by J. E. Cooper.

Exhibits.

By Mr. R. Standen: *Ashmunella thomsoniana*, sub. sp. *porterae* Pils. & Ckll., from an altitude of 8,000 feet, Beulah, New Mexico, recently added to the Manchester Museum collections by Mr. T. D. A. Cockerell.

By Mr. F. Taylor: *Hyalinia nitidula* var. *helmi*, from Compstall; *Cochlicopa lubrica* var. *hyalina*, *Helix pygmaea*, *Vertigo substriata*, and *Planorbis nautilus* from Romiley; *Arion minimus* from Park Bridge.

By Mr. J. W. Jackson: *Dreissensia polymorpha*, young stages shewing unusually distinct and beautiful markings, from Bingley, Yorks.; abnormal *Physa heterostropha* from canal, Guide Bridge; *Planorbis nautilus* from Haveleyhey, Cheshire, and a number of shells from Romiley, Cheshire, including a short stumpy form of *Carychium minimum*, found in abundance.

By Mr. B. R. Lucas: *Bythinia tentaculata* shewing "erosion bands," River Foss, York.

By Dr. C. Gerland: *Astarte borealis*, dredged by himself in Danes Gat, opposite Andre's balloon station, N.W. Spitzbergen, lat. 80° N., July, 1896.

By Mr. W. E. Hoyle: Examples of *Tracheloteuthis* from Messina, and a number, including Steenstrup's types, received on loan from the Copenhagen Museum; a comparison of these specimens showed that the two species of the genus were in reality one. Hence the specimen recorded in the Society's "List of British Marine Mollusca," no. 710, as *T. behni* should have been *T. riisci*. One of the Copenhagen specimens is also from the British area.

A fine series of *Helix virgata*, shewing diversity in size, coloration and banding, was exhibited by Messrs. Collier, Lucas, Baldwin and Wadsworth. Mr. Standen also exhibited the extensive series in the "Stubbs," "Oldham," Manchester Museum, and the Society's collections; the locality sets shewn covered most of the British stations.

318th Meeting, March 11th, 1903.

Mr. J. Cosmo Melvill in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

New Members Elected.

George Abbott, Alexander Street, Kettering.

W. Charles Cattell, The Poplars, Montagu Street, Kettering.

Resignation.

Dr. F. W. Gamble.

Proposed Library Catalogue.

With a view of eliciting the opinions of the Members of the Society, it was announced that the Council had been considering the desirability of printing a new edition of the Library Catalogue. It was suggested that it should be issued in the *Journal* in eight page instalments, and separate copies published in pamphlet form when complete.

Papers Read.

"The genera *Pseudoliva* and *Macron*," by J. Cosmo Melvill.

"*Vitreola rogersi*, n. sp.," by B. B. Woodward.

"New species of Land Shells from Central Africa," by Edgar A. Smith.

"Some results of a flood in North Ireland," by R. Welch.

Exhibits.

By Mr. B. R. Lucas: *Paludestrina jenkinsi*, type and carinated forms, and *Sphærium ovale*, from canal at Chester; also *Vertigo antivertigo* from Budworth Mere, Cheshire.

By Mr. E. Collier: Very fine examples of *Ærope caffra* Fér., Natal; *Ariophanta trifasciata* Chem., India; and *Ceres salleana* Gray, from Vera Cruz.

By Mr. E. H. Turner: Specimens of *Polygyra* and *Cochlostyla*.

By Mr. J. C. Melvill: A series of *Pseudoliva*, *Macron*, *Bullia*, *Purpura*, and *Oliva* to illustrate his paper.

By Mr. R. Welch: Maps, photographs and specimens to illustrate his paper.

By Mr. C. H. Moore: A number of specimens of a small unidentified *Vitreola* from a greenhouse at Salybridge.

By Mr. C. Oldham: Cheshire mollusca, from hitherto unrecorded localities, viz.,—*Pisidium nitidum* Mouldsworth and Knutsford; *Hyalinia nitida* Knutsford Moor; *Clausilia laminata* Minshall Vernon; *Valvata cristata* Tabley Pool; *Anodonta cygnea* Pickmere, Tabley Pool and Hatchmere; *Anodonta cygnea* v. *rostrata* Tabley Pool. Specimens malformed owing to injury inflicted by herons. *Anodonta anatina* Redes Mere, posterior end gnawed by otters. *Anodonta anatina* River Cefni, Holland Arms, Anglesea, a peculiar incurved form closely resembling *Unio littoralis* Lam. in shape of shell.

By Mr. E. A. Smith: Type specimens and drawings of the new species described in his paper.

There was an interesting exhibit of British forms of *Planorbis*, some especially fine series, chiefly local, being shown by Messrs. E. Collier and J. W. Jackson. The Manchester Museum set was also shown.

VERTIGO HELDI IN IRELAND.

BY J. R. LE BROCKTON TOMLIN, M.A.

(Read before the Society, Jan. 14th, 1903).

IN September, 1901, in company with Messrs. Chaster, Standen, Stelfox and Welch, I collected a living specimen of *Vertigo* near Ballintoy, Co. Antrim, which at the time was very doubtfully referred to an elongate variety of *V. pygmæa* or *V. alpestris*—its colour and texture suggesting the former, its cylindrical form the latter species.

Dr. Scharff, who kindly examined the specimen, identified it as a form of *V. alpestris* resembling *V. heldi* Clessin. This opinion is confirmed by Dr. Boettger of Frankfurt-am-Main, after careful comparison with a specimen received from Clessin; and he also prefers to range *V. heldi* as a subspecies under *V. alpestris*. Clessin's description of *V. heldi*¹ is as follows:—"Shell rimate, turreted, irregularly and very finely striate, reddish-brown, glossy; whorls six, slowly increasing, somewhat arched; the first three form the blunt apex of the shell, the last three are almost identical in height, and form the remaining cylindrical portion; the last whorl is neither swollen nor contracted before the mouth; mouth about one-fourth of the length of the shell, somewhat compressed on the outer side, in such a way that the compressed part is prolonged for a short distance over the last whorl in the form of a deep channel; teeth very small, reddish, deeply inserted—one parietal, one columellar, two palatals very small and sometimes absent; periphery continuous, only slightly thickened. Length 2.5 mm., breadth 1.2 mm. Habitat—Hitherto only found dead in the rejectamenta of the rivers Danube and Jagst.

This species is well marked by its size, colouring and shape, and, though it recalls *V. pygmæa* in dentition, is very strikingly distinct from that species in every other respect."

Westerlund² very rightly takes exception to the word 'turreted' in the above description and emends it to 'cylindrical.' The form appears to be very rare on the continent, and I can only ascertain four localities, all in Germany, viz.:—Regensburg and Günzburg on the Danube, Schönthal on the Jagst, and Neckarthailfingen on the Neckar (Goldfuss). No doubt its true habitat is an Alpine one. Its range would be appreciably extended if Clessin is correct in placing *V. haussleri* Sterki,³ from Brugg, in Switzerland, as a synonym of his *V. heldi*. Westerlund (*l.c.*), however, from the figures thinks the two species distinct.

¹ *Nachr.-Bl. Mal. Ges.*, 1877, p. 49, and "Deutsche Exk.-Fauna," ed. 2, p. 266.

² "Binnenconch.," iii., 133.

³ *Nachr.-Bl. Mal. Ges.*, 1883, p. 72.

As may be inferred from Clessin's remarks, the resemblance to *V. pygmæa* is somewhat superficial and it is with *V. alpestris* that its true affinities lie. Placed side by side with a typical *V. alpestris* it differs in possessing an extra whorl and larger dimensions every way, in its reddish-brown colour, in its feebler dentition, and in the shape of the mouth, the outer margin of which slopes very obliquely from right to left, thus producing the sort of channel at the top to which Clessin refers. It is, of course, impossible to dogmatise over such scanty material, but the opinion is well-nigh unanimous among British conchologists who have seen it that the specimen here referred to *V. heldi* is entitled to specific rank.

[Since this was written Mr. B. B. Woodward has called attention to the fact that *V. heldi* is said to be striated, whereas my specimen, under a one-inch objective, is seen to be smooth and glassy. It is, therefore, not at all certain that the reference to *V. heldi* is correct, but for the present it seems best to let it stand under that name.—*March 17th, 1903*].

Report on the Bardsley Ramble.—Bardsley, the district chosen for the ramble, is well known to most Manchester conchologists, and was, some years ago, a favourite collecting ground; but during more recent years has been somewhat neglected by them, and the investigations carried on by members living in the neighbouring towns of Ashton-under-Lyne and Oldham, between which towns the district lies. The natural beauty of the locality is fast disappearing, the sides of the main valley, once well clothed with trees and herbage, are almost denuded, but where the herbage still lingers a few nice shells may be taken. Holden Clough, which branches off the main valley near Bardsley Bridge, is the best wooded part, and in the wet places there, molluscan life is abundant. The ponds and canal are still very prolific, although the canal fauna is subject to fluctuations, species being very abundant in some years, and then almost absent at other times. The ramble took place on Saturday afternoon, Sept. 13th; the weather during the week had been cold and wet, but had much improved during Saturday morning, although rain still threatened. A pond near the station a few years ago swarmed with *Limnea palustris*, but now this species has disappeared, *L. stagnalis* having taken its place. Another pond, which once yielded albino *Planorbis corneus*, was now in such bad condition, and the shells so badly eroded and encrusted with black dirt, that it was difficult to pick out the albinos, of which only five examples were taken. Holden Clough yielded *Hyalinia nitida*, *Hy. fulva*, *Hy. crystallina*, *Cochlicopa lubrica*, *Vertigo substriata*, *Carychium minimum*, etc. (*H. pygmæa* occurs there, but on this occasion was not taken). The little wood below the canal was very productive, *Hyalinia excavata* type and var. *vitulina* were found; in one small spot the type occurs in hundreds, and not a single specimen of the variety has ever been taken there, although a little further down the stream both forms occur together in about equal numbers; other species of *Hyalinia* were taken in the wood, also *Pupa cylindracea*, *Cochlicopa lubrica* var. *lubricoides*, *Helix rotundata*, etc. In the lower canal that passes through Droylsden, we found *Paludetrina jenkinsi* still flourishing; at each sweep of the scoop hundreds were brought up, both of the typical and the crested variety.—FRED TAYLOR (*Read before the Society, Nov. 12, 1902*).

VITREA ROGERSI n.sp.,

A British form hitherto misidentified with *Helix glabra* Studer,
and *Hyalinia helvetica* Blum.

By B. B. WOODWARD, F.L.S., &c.

(Read before the Society, March 11, 1903).

(PLATE VI.)

THAT a well-known and recognised species of British land mollusc should be wanting a name sounds, at first, extraordinary; such, however, appears to be the case.

When in 1870 the late Mr. T. Rogers, of Manchester, found in Marple Wood, Cheshire, a form of *Vitrea* (*Zonites*, as it was then termed) that, though closely allied to *V. alliaria* manifestly differed from it, he naturally submitted it to Dr. Gwyn Jeffreys. The latter identified it¹ with the "*Helix glabra* of Studer, Fér. Prodr. no. 215": in this he was probably not only following Dupuy and Moquin-Tandon, but relying on named examples received from continental conchologists, and he returned to Mr. Rogers a specimen, now in my possession, collected by himself in Normandy.

Jeffreys further remarks "I also found the same species in 1846 at Grassmere, and in 1857 at Barmouth, but had overlooked it." It seems generally to have been confused with *V. alliaria*, and frequently is at the present day by observers who should know better. Gray certainly put it with that species, for Dupuy in 1849 writes² "C'est à tort, ce me semble, que M. Gray ("*Turt. Man.*," p. 169) rapporte cette espèce à l'*H. alliaria* Miller, qui m'en paraît bien distincte" and Dupuy's figures³ certainly appear to be of the form now in question.

Later on, however, as the true *V. glabra* of Studer, or rather of Rossmäessler⁴ since he was the first to describe it, became known it was manifest that the various authorities had misidentified this north-western European form, for the true *V. glabra* is a larger and much flatter shell with a far smaller umbilicus.

1 *Ann. and Mag. Nat. Hist.*, (4) vol. 5, p. 385, 1870.

2 "*Hist. Nat. Moll. France*," p. 228.

3 *Op. cit.* pl. x., f. 6a-c.

4 The history of this specific name is interesting; it first appears in Férussac's "*Tableaux Systématiques*" (1821) *Limaçons*, p. 45, "no. 215 *glabra*, Studer: *Helix nitida*, Charpentier." (The reference to Charpentier cannot be traced, possibly it refers to specimens sent under that name by Charpentier to Férussac). It is next cited by Charpentier (*Neue Denkschr. allg. Schweiz. Gesellsch.*, vol. 1, mém. 2, 1837, p. 13) as "46 *Helix glabra*, Stud. et Fér.: *H. lurida*, Studer Cat. (sans les synonymes)." Here the reference to Studer cannot be traced unless "*lurida*" is a misprint for "*lucida*," and the citation intended to refer to the appendix to Coxe's "*Travels in Switzerland*;" both these are without any description, but Charpentier gives an unmistakable figure (*loc. cit.*; p. i., f. 22): finally it was described and figured by Rossmäessler in his "*Iconographie*," vol. 2 (Heft. 7, 1838), p. 36, pl. 39, no. 528.

For some time, however, the name was retained in use; latterly the form has been relegated to *V. helvetica* Blum.¹ and this identification has crept into literature. Many years ago the present writer began to investigate the question but from lack of material was compelled to let the matter bide; now, however, the question has once again come up for judgment and thanks to the kind assistance of Mr. J. H. Ponsonby, to whom he hereby tenders his best thanks, materials have been forthcoming which enable the writer to conclude that the British form, so long the subject of debate, does not belong to any one of the hitherto named species and should therefore receive proper designation, and he therefore proposes to name it in honour of its first discoverer in this country:—

VITREA ROGERSI n. sp. (Pl. VI., figs. 2, 5, 11—13).

Shell depressed, slightly convex above, a little flattened below (especially in the region of the umbilicus, which is narrow, small and deep), shining, very transparent, smooth and polished with obscure almost obliterated lines of growth, visible under the lens, becoming more marked at the suture. Colour pale horn or waxy brown, with an opalascence or milky white tinge around the umbilicus. Spire but little elevated, whorls five, slightly convex, increasing regularly, the last having about twice the diameter of the preceding. Suture well-marked and in some lights having a false appearance of being channelled;² aperture rounded-lunate, the columellar lip, which is not reflexed, being in its first part not much inclined to the axis of the shell, while the axis of the aperture as a whole is; peristome thin and sharp, the ends slightly approximate. Dimensions:—altitude 4.5 mm., diam. maj. 8.5, min. 7.5.

It is the "*Helix glabra* Stud." of Dupuy (*loc. cit.*) and probably, though less certainly, of Moquin-Tandon.³

V. alliaria, Miller (Pl. VI., figs. 6, 14—16) is a smaller shell, and much flatter, especially on the underside, with a larger umbilicus, its aperture is less rotund and the columellar lip more inclined away from the axis of the shell; the sutures (fig. 6), moreover, do not as a rule present the seemingly channelled appearance noted in *V. rogersi*, while the whole shell is duller especially on the upper surface, is greenish in typical specimens and streaked. Both *V. alliaria* and *V. rogersi* have at times the strong scent as of garlic.

V. helvetica, Blum (Pl. VI., figs. 3, 8—10), as appears from a specimen from the type locality sent to Mr. J. H. Ponsonby by Dr. O. Boettger, who received it from Dr. Blum, is a slightly larger shell

¹ *Nachrbl. Deutsch. Malak. Gesellsch.*, vol. 30, p. 141, 1881. The species was found at Weissenstein (Solothurn) where it is rare.

² This is due, as in *V. cellaria* and some other species, to the thickened edge of attachment of one whorl to the preceding showing through the transparent shell (*c.f.* Pl. VI., figs. 4, 5).

³ "Hist. Nat. Moll. France," vol. 2, p. 80, pl. ix., f. 3—8.

(alt. 5.25 mm., diam. max. 9, min. 8 mm.) with higher spire ($5\frac{1}{4}$ whorls), is much flatter beneath especially in the region of the umbilicus which is wider; the aperture is smaller for the size of the shell and as a whole directed more downwards than in *V. rogersi*, while the columellar lip is set more obliquely to the shell axis; it is further less polished on the upper surface while the obscure lines of growth and the puckering at the suture are more marked. The most striking difference, however, is in the rate of increase in the whorls. The relative width of the ultimate to the penultimate whorl, measured radially, is approximately in *V. rogersi* as 2 to 1 whereas in *V. helvetica* it is as 3 to 2.

Vitreá subglabra (Bourg.)¹ is a much larger shell than *V. rogersi*, its dimensions being: alt. 6—9 mm., diam. 13—16 mm., and apparently more like *V. helvetica* as regards the height of its spire and greater coarseness of its surface. Its author especially contrasts it with the *Zonites glaber* of Moquin-Tandon and Dupuy, that is to say *Vitreá rogersi*, he having overlooked their misidentification of the species.

Of the anatomy of the several species here alluded to nothing can at present be said, but the radulæ of *V. alliaria*, *V. rogersi* and *V. helvetica* while closely similar, as was to be expected, in their general aspects present minor differences which support those observable in the shells. Of the two first-named species a small series of radulæ are available but of the last only one luckily extracted from the dried up animal in Mr. Ponsonby's specimen. The character of the teeth in the two former series are so constant that it is fair to infer that they are equally so in examples of *V. helvetica*. The formulæ are:—

V. alliaria 11 : 1 : 2 : 1 : 2 : 1 : 11 = 29 and about 37 rows.

V. rogersi 11 : 1 : 2 : 1 : 2 : 1 : 11 = 29 and about 40 rows.

V. helvética 14 : 1 : 2 : 1 : 2 : 1 : 14 = 35 and about 45 rows.

While the first two species have the same formula the radula of *V. alliaria* is only two-thirds the size of that of *V. rogersi*, but is proportionately to the size of the animal larger. On the other hand *V. helvetica* which is slightly larger than *V. rogersi* has a smaller radula with more rows and more lateral teeth in each row. *V. helvetica* differs markedly from the other two in having no inner cusp on the first admedian tooth. The remaining differences in form between the corresponding teeth in the radulæ of these three species will be better gathered from a careful comparison of the figures here given (Pl. VI., figs. 1—3) than from any description however lengthy.

¹ Bourguignat: "Malac. de la Bretagne," 1860, p. 47, pl. i., figs. 14—16.

A Correction.—In the *Journal of Conchology*, vol. 7, p. 435, *Trophon truncatus* is recorded for Studland Bay. This is an error, the name should be deleted from the list.—J. E. COOPER (*Read before the Society*, February 11, 1903).

Clausilia bidentata and Balea perversa in Ireland.—*Clausilia bidentata* occurs plentifully in Ireland on stone walls, stone heaps, and on the rocky debris of the many glens on the coast. It swarms on old churches such as Downpatrick Cathedral and old ruins like Dunluce Castle, Rock of Cashel or Clonmacnoise, where it shelters in the crevices between the stones. It is common on tombstones in old graveyards in N.E. and N.W. Ireland, is very plentiful, and rather small, in similar situations in Co. Sligo and other western counties. It may be found on trees all over the country, in some places associated with *Balea perversa*, in others not. *Balea perversa* is not so common and is more local in Ireland than *C. bidentata*; it occurs on mossy trees, especially in the older woods and natural thickets of the damp glens—like those of Antrim, Sligo and Kerry. It is plentiful with the other in the little coast glens E. and W. of Ballycastle, Co. Antrim, as a rule on trees, but sheltering more in moss on tree trunks than *C. bidentata* (see this *Journal*, vol. 7, p. 201, 1893). At the head of Murlough Bay in wet weather *Balea* is more plentiful on a dry-built stone wall than anywhere else I have seen it in Ireland, more so even than in Kerry where it is, owing to the abundance of woods, a much commoner species than in North Ireland; here I did not notice *Clausilia*, though the latter is exceedingly plentiful a few feet lower down the slope. At Dromahair, Co. Leitrim, Messrs. Chaster, Collier and I found *Clausilia* on the inner and outer walls of Dromahair Abbey, but on a dry-built limestone wall surrounding the Abbey *Balea* was much more plentiful than *Clausilia*; it was here quite thick under flat stones mainly on top of wall. At Dundrum Castle, Co. Down, *Clausilia* was moderately common in stone débris and on walls; but *Balea* only so on a dyke in the lane below the castle and a few on trees. In about six or eight other localities where I have observed both species together in the north they were living close together, *Balea* on trees, *Clausilia* on or among rocks and trees. County Kerry seems to be the real home in Ireland of *Balea*, which occurs on trees with *Clausilia*, and also on dykes and rock surfaces all over the Killarney and Kenmare districts, even up to 600 ft. altitude. This is mainly an Old Red Sandstone area, though I think it is not so much the geological formation as presence of trees or damp shelter of some kind that regulates the abundance of these two species and their association together. Trees and such situations are, on the whole, more plentiful in limestone areas in Ireland and *Balea* is for that reason, being an arboreal species, more plentiful in such situations, and *Clausilia*, being a common species in damp, and often in dry, situations all over Ireland is of necessity associated with the other. *Balea* is however, as I have said more local, and absent in many places devoid of trees, while *Clausilia* is common on walls and rocks; but where trees are plentiful and old, the two species will be found together.—R. WELCH (*Read before the Society*, Dec. 10, 1902).

Occurrence of *Vertigo alpestris* at Holker, Lancs.—On the 4th of September, 1902, whilst examining old walls, etc., for shells at Holker, near Cartmell, Morecambe Bay, I discovered some specimens of *Vertigo*, which have since been identified by Mr. Standen as *V. alpestris*. September 3rd had been a very wet and stormy day and the morning of the 4th was also somewhat damp. The shells, though not quite so large, are much more perfect specimens than those from Bingley, exhibited by Mr. Taylor in January, 1902. This I believe is the first really authenticated find of *V. alpestris* in the district, and as the Furness district is separated by a wide estuary from Holker and Cartmell, it is not very probable for them to be stray specimens from the other side of the water. The number [taken was eighteen. On March 4th, 1903, I revisited the spot (along with Messrs. Taylor and Wadsworth) and 51 others were taken.—C. H. MOORE, Stalybridge (*Read before the Society*, February 11, 1903).

BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Nautilus, vol. 16, nos. 8—11, Dec., 1902—Mar., 1903.

"Surface Sculpture in *Ancylus*," by BRYANT WALKER [divided into two groups according as the apex is striate or smooth]. "A new Haitien *Chondropoma* [*C. superbum*]," by J. B. HENDERSON and C. T. SIMPSON. "Notes on North American *Calyculina*," by Dr. V. STERKI [15 spp., *C. hodgsonii*, *C. ferrissii*, nn.spp.]. "A new *Rissoa* [*R. kelseyi*] from California," by W. H. DALL and P. BARTSCH. "*Vitrea draparnaldi* Beck in Washington, D.C.," by G. W. H. SOELNER. "Notes on *Linnaea*," by T. D. A. COCKERELL [importance of comparing American and European forms].

"New species of Tertiary Fossils from Alabama, Mississippi and Florida," by T. H. ALDRICH [12 nn. spp., figd. on pls. 3 and 4]. "A new *Crassatellites* [*C. brasiliensis*] from Brazil," by W. H. DALL. "Shell collecting on the Mississippi," by F. C. BAKER [account of a day's excursion, with list of 39 spp. taken]. "A new Fossil *Ashmunella*," by T. D. A. COCKERELL [*A. thompsoniana pecosensis*, Pecos, New Mexico]. "Notes on some Shells from North Carolina," by E. G. VANATTA [*Omphalina rugeli oxycoccus* n. var.; lists from several localities].

"Notes on *Pyramidula elrodi*," by M. J. ELROD [account of finding and habitat, with view and figures]. "Adaptation of Mollusks to changed conditions," by A. C. BILLUPS. "New Land Shells of the Japanese Empire," by H. A. PILSBRY and Y. HIRASE [*Eulota* (*Euhadra*) *sadoensis*, *Ganesella notoensis*, *Chlorites echizenensis*, nn. spp.]. "Note on *Tritonia palmeri* Cp.," by T. D. A. COCKERELL [re-described]. "Some Homonymous Generic Names," by T. D. A. COCKERELL [some new generic names proposed in place of others pre-occupied].

"On the specific validity of *Campeloma milesii* Lea," by BRYANT WALKER [defended as a good species, figured along with allied forms]. "The Land Shells of Calhoun Falls, S.C.," by A. C. BILLUPS [24 forms, mostly of *Polygyra*, recorded]. "New Land Shells of the Japanese Empire," by H. A. PILSBRY and Y. HIRASE [*Helicina sadoensis*, *Microcystina higashiyamana*, nn. spp.]. "*Helicina japonica* and related forms" [with key for determination] by H. A. PILSBRY. "A new *Conus* [*C. wallonensis*] from the Tertiary of Florida," by T. H. ALDRICH.

Journal de Conchyliologie, vol. 50, no. 3. [Received Jan. 20, 1903].

"Revision des Cypreïdæ de la Nouvelle-Calédonie," by PH. DAUTZENBERG [with plate]. "A propos du type de l'*Helix prunum* Férussac," by H. FISCHER [records the existence of the type in the Paris Museum]. "Exploits d'escargots," by P. PALLARY [train stopped by snails].

Journal of Malacology, vol. 9, no. 4, Dec., 1902.

"Description of a new species of *Gomphina* [*G. maorum*] from New Zealand," by E. A. SMITH. "On the Systematic Position of *Patella kermadecensis* Pilsbry," by H. SUTER [should be placed in section *Ancistromesus* Dall]. "A Classified List of the Helicoid Land shells of Asia, pt. 4," by G. K. GUDE [lists from Armenia, Transcaucasia, Asia Minor and Islands]. "Some Notes on the genus *Prisma* Simroth," by W. E. COLLINGE [*P. smithi* n. sp., *P. prismatica*, *P. heyneimanni* described and figured]. "Further Notes on *Amalia carinata* Risso," by W. E. COLLINGE [occurs in Ireland in addition to *A. soverbyi* Fér.]. "The Anatomy of the British species of the genus *Solen*, pt. 4," by H. H. BLOOMER [with plate]. "*Physa virgata* mut. *alba* nov.," by T. D. A. COCKERELL [Arizona]. "*Limax maximus* L., in the Hawaiian Islands," by W. E. COLLINGE.

The Irish Naturalist, vol. 12, nos. 1-2, Jan.-Feb., 1903.

"The Re-discovery of *Vertigo lilljeborgi* in Ireland," by G. W. CHASTER and B. TOMLIN [Ballynahinch and Roundstone]. "The Marine Mollusca of Narin

Strand, Co. Donegal," by Miss A. L. MASSY [12 spp., new records for N.W. Ireland]. "*Succinea oblonga* near Mallow;" *Cæcilianella acicula* in Co. Waterford," by P. H. GRIERSON. "Animal Remains from Gobbins Caves, Co. Antrim," by R. F. SCHARFF [Mollusca 4 spp.].

La Feuille des Jeunes Naturalistes, (4) année 33, no. 388, Feb., 1903.

"Note sur quelques fossiles des faluns de la Touraine (Helvétien inférieur) et des environs d'Orthez (Helvétien supérieur)," by M. PEYROT [*Nassa miqueli* n. sp.].

Proceedings of the Academy of Natural Sciences of Philadelphia, vol. 54, pt. 2, May—Sept., 1902.

"Additions to the Japanese Land Shell Fauna. VI.," by H. A. PILSBRY [chiefly detailed descriptions of names previously published; illustrated by 5 pls.].

"The Mollusca of the Mt. Mitchell Region, North Carolina," by B. WALKER and H. A. PILSBRY [report on a collection made by Messrs. Ferris and Walker in 1901 to Mt. Mitchell, the highest peak of the Appalachians; 112 species recorded and several nn. spp. figured in pls. 24-25]. "Phylogeny of the species of *Fulgur* with remarks on an abnormal form of *Fulgur canaliculatum*, and Sexual Dimorphism in *Fulgur carica*," by BURNETT SMITH. "Southwestern Land Snails," by H. A. PILSBRY [about 20 spp. and n. var. from Texas, &c.]. "On some Living and Fossil Snails of the genus *Fhyssa*, found at Las Vegas, New Mexico," by ADA SPRINGER. "Additions to the Japanese Land Snail Fauna," by H. A. PILSBRY [7 nn. spp. of *Clausilia*, figured with others in pls. 27 and 28].

Annales de la Société Royale Malacologique de Belgique, tome 36, 1901.

"Description de trois mollusques nouveaux provenant de l'Etat indépendant du Congo," by PH. DAUTZENBERG [*Achatina marteli*, *Melania hibrechtsi*, *Unio briarti* figured in pl. 1]. "Appendice No. 3 au catalogue illustré des coquilles fossiles de l'éocène des environs de Paris," by M. COSSMANN [pls. 2—7]. "De la valeur marchande et du degré de rareté actuel de *Pleurotomaria beyrichi*," by H. DE CORT [price gradually lowering owing to capture of numerous examples]. "Diagnoses de quelques espèces de coquilles nouvelles et d'un genre nouveau provenant de l'Etat indépendant du Congo, suivies de quelques observations relatives à des espèces déjà connues," by P. DUPUIS and S. PUTZEYS [11 nn. spp., *Ceras* n. gen., with outline figures]. "*Panopæa honi* Nyst," by E. VINCENT [figured].

Bihang till Kongl. Svenska Vetenskaps-Akademiens Handlingar, vol. 27, part 4.

"Ueber eine Molluskfauna vom Grey Hook auf Spitzbergen," by E. KAYSER [4 nn. spp. fossils described; *Nuthorstella* n. gen.].

The Annals of Scottish Natural History, no. 45, Jan., 1903.

"Mollusca observed at Stromness, Orkney," by J. WATERSTON [15 spp. of Land and Freshwater Mollusca recorded]. "*Pupa anglica* (Fér.) in Linlithgowshire," by W. EVANS.

Journal and Proceedings of the Hamilton Association, 1898-99, no. 15.

"Malacology," by Col. C. C. GRANT [nothing new].

"**Synopsis of the Family Veneridæ** and of the North American Recent Species," by W. H. DALL (*Proc. U.S. Nat. Mus.*, vol. 26, pp. 335—412, pls. 12—16, no. 1312) [137 species recognized, distributed in 22 genera, *Cyclinella*, *Psephidia*, nn. genn.].

"**Notes on Holocene Mollusca from North Cornwall**," by the Rev. R. ASHINGTON BULLEN (*Proc. Malac. Soc.*, vol. 5, pt 3) [10 marine, 15 L.F.W. forms, with notes of occurrence, etc.].

"**The Manchester Museum, Owens College: Descriptive Catalogue of the Embryological Models**," by S. J. HICKSON [the only mollusc referred to is the trochophore larva of *Teredo*].

DESCRIPTIONS OF NEW SPECIES OF LAND SHELLS FROM CENTRAL AFRICA.

BY EDGAR A. SMITH

(Read before the Society, March 11, 1903).

(PLATE IV.).

THE majority of the species here described are from Uganda, and were collected by the late William Doherty on the Mau Escarpment in the Eastern Province of the Uganda Protectorate, at an elevation of 6,500—9,000 feet.

Particular attention may be called to one of the species of *Ennea* (*E. prodigiosa*) which exhibits a very remarkable loop-like sinus at the upper part of the aperture.

1. *Ennea unilirata*. (Pl. IV. fig. 8).

Testa parva, ovata, cornea, pellucida; spira marginibus curvatis, ad apicem obtuse conoidea; anfractus sex, convexi; sutura profunda vix obliqua sejuncti, oblique leviter striati, supra ad suturam crenulate, ultimus ad aperturam ascendens, supra dorsum transversim scrobiculatus; apertura parva, dente parietali tenui lamelliformi, et lira palatali longe intus sita munita; peristoma leviter incrassatum et reflexum, margine externo in medio intus prominente, columellari late dilatato. Longit. 3.25 mm., diam. 1.75 mm.

Hab., E. Uganda.

The remarkable keel-like liration within the outer wall of the body-whorl, indicated exteriorly by a scrobiculation running parallel with the suture, distinguishes this species from its allies.

2. *Ennea commoda*. (Pl. IV., fig. 9).

Testa pupoidea, albida, subpellucida; spira cylindracea, ad apicem obtuse conoidea; anfractus 7½, convexiusculi, sutura subprofunda parum obliqua sejuncti, superiores duo laeves, cæteri confertim tenuiter oblique striati, ultimus pone labrum contractus et profunde bi-scrobiculatus; apertura parva, quadridentata; dens parietalis magnus, lamelliformis, palatalis æque magnus, columellaris maximus longe intus situs, alter minor versus basim; peristoma expansum, reflexum, marginibus callo tenui junctis, externo denti parietali juncto. Longit. 4 mm., diam. 2 mm.

Hab., E. Uganda.

In addition to the teeth described, a fifth minute tubercle is visible in some specimens at the base of the palatal tooth.

3. *Ennea insolita*. (Pl. IV., fig. 10).

Testa parva, pupoidea, vitrea, pellucida, polita, tenuis, rimata; spira subcylindracea, supra obtuse conoidea; anfractus 7-8, convexiusculi,

lente accrescentes, sutura ferehorizontali anguste pellucido-marginata sejuncti, striis obliquis vix conspicuis sculpti, ultimus antice leviter descendens, pone labrum contractus et fortiter scrobiculatus; apertura parva, rotundo-quadrata, antice angustior quam supra, quinque-dentata, dente parietali aliis longe majori; peristoma incrassatum reflexum, margine dextro supra denti parietali juncto. Longit. 3.5 mm., diam. 2 mm.

Hab., E. Uganda.

The armature of the aperture is very remarkable. The parietal tooth is a squarish plate, thin, flat and narrowed where it is attached to the whorl. This narrowing is only observable when the plate is viewed laterally. The tooth is very prominent and stands out beyond the level of the labrum to which it is united, forming a loop-like sinus. The remaining four teeth are almost of equal size, and situated further within the aperture, one on the columella, one basal, and two within the outer lip. The exterior of the whorl exhibits indentations corresponding to these denticles.

4. **Ennea prodigiosa.** (Pl. IV., fig. 11).

Testa parva, tenuis, vitrea, polita, breviter cylindracea, ad apicem obtuse rotundata, anguste umbilicata; anfractus quinque, valde convexi, sutura profunda vix obliqua sejuncti, striis obliquis vix conspicuis sculpti, ultimus antice angustatus, productus, solutus, tubiformis, pone labrum scrobiculatus, supra profunde sinuatus; peristoma tenue, leviter expansum, supra sinu parvo fere circulari interruptum; apertura quinquedentata, minima; dens parietalis lamelliformis prominens, dentes duo columellares subequales, unus ad basim similis, palatalis unus obliquus lamelliformis. Longit. 2.5 mm., diam. 1.5 mm.

Hab., E. Uganda.

A most remarkable species on account of the deep slit extending from the prominent lip almost to the suture, and terminating in an almost completed circular opening.

5. **Ennea columella.** (Pl. IV., fig. 12).

Testa cylindracea, vitrea, polita, rimata; spira elongata, cylindracea, ad apicem obtuse rotundata; anfractus 6½, superiores tres convexiusculi, cæteri minus convexi, sutura leviter obliqua et anguste pellucido-marginata sejuncti, ultimus antice leviter descendens, pone labrum contractus, sed vix scrobiculatus; apertura minima, semiovata, quadridentata; peristoma angustum, leviter incrassatum et reflexum, marginibus remotis, callo tenui junctis; dens parietalis magnus, prominens, lamelliformis, columellaris magnus, longe intus situs, palatalis minor, obliquus, lamelliformis, ad labrum haud attingens, basalis minimus, transversus. Longit. 2.75 mm., diam. 1 mm.

Hab., E. Uganda.

The last four whorls constituting the greater part of the shell are about equal in width.

6. **Pyramidula (Gonyodiscus) ugandana.** (Pl. IV., fig. 13).
Testa minuta, orbicularis, late et perspective umbilicata, dilute fuscescens; spira depressa, supra anfr. ultimum parum elata; anfractus 4½, convexi, sutura profunda sejuncti, striis incremente tenuissimis confertis sculpti, ultimus haud descendens; apertura oblique lunata; peristoma tenue, extremitatibus remotis, et margine columellari leviter expanso. Diam. 2 mm., alt. 1 mm.

Hab., E. Uganda.

Nicely cleaned specimens have a somewhat silky appearance.

7. **Pyramidula (Gonyodiscus) imitata.** (Pl. IV., fig. 14).
Testa P. ugandanae similis, sed minus depressa, angustius umbilicata, lineisque incrementi majus remotis obliquis arcuatis ornata; anfractus quatuor, convexi, sutura profunda discreti; apertura oblique lunata; peristoma tenue, simplex, margine columellari vix expanso. Diam. 2.5 mm., alt. 1.3 mm.

Hab., E. Uganda.

A minute discoid shell resembling *P. ugandana* in colour and general appearance. It is, however, although consisting of the same number of whorls, noticeably larger when placed side by side. It is also more narrowly umbilicated, and the growth-lines are quite different, being decidedly more distinct and more distant.

8. **Pyramidula (Gonyodiscus) lamellifera.** (Pl. IV., fig. 15).
Testa depressa, discoidea, subaperte umbilicata, fuscescens, striis incrementi tenuibus confertis, lamellis remotionibus conspicuis ornata; spira depressa, in medio vix elata; anfractus 3½, convexi, sutura profunda sejuncti, primus laevis, pellucidus; apertura fere circularis; peristoma tenue, margine columellari vix expanso. Diam. 2.75 mm., alt. 1.3 mm.

Hab., E. Uganda.

This species is a little flatter above than *P. imitata*, more openly umbilicated, and at once distinguished by the lamellæ, which, starting at the suture, pass obliquely across the body-whorl, but become obsolete as they pass into the umbilicus.

9. **Martensia percivali.** (Pl. IV., fig. 16).
Testa depresso conoidea, anguste umbilicata, solidiuscula, albida, cretacea, ad apicem rufescens, haud nitida, incrementi lineis oblique arcuatis confertis subregularibus sculpta; spira breviter conoidea, ad apicem paulo obtusa; anfractus 6½, lente accrescentes, sutura subprofunda sejuncti, superiores duo laeves, rufescentes, cæteri albidus vel interdum dilute fusco strigati, ultimus antice vix descendens, primo supra aperturam obsolete angulatus, angulo antice evanescente; apertura oblique lunata, intus rufo-fusca; peristoma tenue, intus albo margina-

tum, margine columellari ad insertionem expanso, reflexo, umbilicum semi-obtegente. Diam. maj. 23 mm., mim. 20 mm., alt. 15 mm.

Hab., southern slope of Mount Kilima-njaro, East Africa (A. B. Percival).

A very fine species, well characterized by its white chalky appearance, the reddish apex, and coloured aperture. The striæ on the third, fourth and fifth whorls are fairly regular, and rather thread-like, but upon the body-whorl, especially on the lower surface, they are less even and not quite so apparent. In some examples the whiteness of the shell is broken up with pale brown or corneous streaks, as if the texture of the shell was not covered at these places by the superimposed white layer.

Several specimens have been presented to the British Museum by A. B. Percival, Esq.

10. **Limicolaria keniana.** (Pl. IV., fig. 17).

Testa elongata, ovata, imperforata, cæruleo-albida, strigis angustis, rufo-fuscis oblique arcuatis vel undulatis, irregulariter picta, periostraco flavo-olivaceo induta; spira elongata, superne obtusa; anfractus sex, convexiusculi, incrementi lineis striati, striisque spiralibus transversim sculpti, plus minus granulati, ultimus et penultimus infra suturam linea impressa marginati, ultimus antice lente descendens; apertura inverse auriformis, longit. totius circiter $\frac{2}{3}$ adæquans, intus cæruleo-albida; perist. tenue, margine columellari leviter incrassato, reflexo, recto, fere perpendiculari, supra obsolete uniplicato, extra fusco tincto. Longit. 50 mm., diam. 25 mm., apertura 21 mm. longa, 13 mm. lata.

Hab., Mount Kenia, British East Africa (S. L. Hinde).

This species is peculiar on account of the thick obtuse spire, in which respect it bears some resemblance to *S. dohertyi* Smith¹ from Uganda. The slightly oblique lines of growth being crossed by the spiral striæ have a granose appearance quite visible to the naked eye. The three apical whorls in the single specimen at hand are somewhat eroded and are of a dirty purplish brown colour. Presented to the British Museum by S. L. Hinde, Esq.

11. **Subulina uncta.** (Pl. IV., fig. 18).

Testa elongata, tenuis, pellucido-cornea, polita, anfractus 8, subceleriter accrescentes, convexi, lineis incrementi obliquis vix conspicuis sculpti, ultimus elongatus; spira ad apicem mammillata; sutura obliqua, linearis, infra linea pellucida marginata; apertura inverse auriformis, longit. totius $\frac{1}{3}$ haud æquans; labrum tenue, simplex; columella arcuata, antice truncata, callo reflexo, tenui induta. Longit. 17 mm., diam. 5.25 mm., apertura, 5 mm. longa, 3 mm. lata.

¹ *Journ. Malacol.*, vol. 8, p. 95, fig. 4, 1901.

Hab., Lagari, British East Africa.

The single specimen described was collected by Mr. Steuart Betton who presented it, together with other interesting zoological specimens, to the British Museum. It is remarkable for its very smooth glossy surface and form.

12. **Subulina dohertyi.** (Pl. IV., fig. 19).

Testa elongata, ovato-fusiformis, tenuis, pellucida, pallide cornea, nitens; anfractus sex celeriter accrescentes, superiores duo laeves convexi, cæteri convexiusculi, sutura obliqua profunda sejuncti, striis tenuibus oblique subflexuosis regulariter sculpti, ultimus elongatus, peroblique descendens; apertura ovata, superne acuminata; labrum tenuissimum; columella arcuata, antice breviter truncata, callo tenui induta. Longit. 9.5 mm., diam. 2.75 mm., apertura 3 mm. longa, 2 mm. lata.

Hab., E. Uganda.

The form of this species is rather unusual, and the striæ are distinct and regular.

13. **Opeas lenta.** (Pl. IV., fig. 20).

Testa elongata, gracilis, tenuis, pellucida, nitida, oblique confertim tenuissime striata; anfractus 10, lente accrescentes, superiores duo laeves convexi, cæteri convexiusculi, sutura subprofunda obliqua sejuncti, ultimus haud descendens; apertura parva, inverse auriformis; labrum tenue, leviter angustissime expansum; columella expansa et convexa reflexa. Longit. 10 mm., diam. 2.75 mm., apertura 2 mm. longa, 1.5 mm. lata.

Hab., E. Uganda.

The raised striæ are very slender, closely packed, thread-like and oblique. Two or three at distant intervals, former labra, are more conspicuous than the rest.

14. **Opeas venusta.** (Pl. IV., fig. 21).

Testa elongata, gracilis, pellucida, nitens, vix striata; anfractus 10, lentissime accrescentes, supremi duo globosi, cæteri convexiusculi, ultimus brevis; apertura parva, inverse auriformis; peristoma tenue, margine dextro arcuato, columellari ad insertionem dilatato et reflexo. Longit. 9 mm., diam. 1.5 mm., apertura 1 mm. longa, 0.75 mm. lata.

Hab., E. Uganda.

More slender and smaller than *O. crenulata* Smith,¹ from the same locality and without any crenulations beneath the suture. The increase of the whorls is very gradual and there is scarcely any difference in the height of the last five whorls.

THE GENERA PSEUDOLIVA AND MACRON.

By JAMES COSMO MELVILL, M.A., F.L.S.

(Read before the Society, March 11, 1903).

THE genus *Pseudoliva*, instituted by Swainson in 1840, and having precedence over *Gastridium* Sowerby (*non* Modeer) has been maintained entirely upon conchological grounds, the animal being then, as now, practically unknown. The opercula, however, of two or three species being found to differ fundamentally *inter se*, Messrs. Henry and Arthur Adams separated¹ the Western-American species *P. kellettii* H. Ad. and *P. æthiops* Reeve from the typical *P. plumbea* Chem., the Swainsonian type of the genus, under the name of *Macron*, this being at first employed only subgenerically.

It is worth while here to reproduce their diagnosis in its entirety.

“Fam. *Muricidæ*. Sub-fam. *Purpurinæ*.”

“Genus PSEUDOLIVA Swainson.

“Shell ovate, solid, subglobose; spire very short, suture slightly channelled, whorls tumid round the upper part; aperture oval, canal very short; inner lip arcuated, with a callosity at the hinder part; outer lip thin, furnished at the fore part with a small tooth or callosity.

“Syn.: *Gastridium* Sow., not Modeer. *Gastridia* Gray.

Pseudodactylus Herm.

“Ex. *P. lævis* Martini.

“*Pseudoliva*, known only by its shell and operculum, reminds one of *Olivancillaria* among the *Dactylidæ*, but is distinguished by its large *Purpura*-like operculum, and the tooth on the outer lip. The species are few in number, and come from Africa and California.

lævis Mart.

striata A. Adams.

sepimenta Rang.

zebrina A. Adams.

Subgen. MACRON H. & A. Adams.

“Inner lip with the callus defined; columella obliquely wrinkled; spire elevated, suture channelled.

Æthiops Reeve.

Kellettii A. Ad.”

Mr. G. B. Sowerby, in his monograph of the genus, enumerating eight species (inclusive of *Eburna australis* Swb.), makes the following remarks:—

They—the *Pseudolivæ*—present a pretty natural group of buccinoid shells, which have a groove encircling the lower part of the whorls, and generally terminating at the edge of the outer lip in a sort of obtuse tooth. A canal is formed at the upper angle of the aperture by the swelling of the outer lip, and a kind of callus on the columella, and the anterior part of the aperture is, in nearly all the species, deeply notched. The columellar lip is thickened over the body whorl. Operculum horny with central nucleus.

¹ H. & A. Adams, “Genera of recent Mollusca,” vol. 1, pp. 131-132.

EXPLANATION OF PLATE V.

GIVING THE BOUNDARIES OF THE "VICE-COUNTIES" SHOWN
ON THE MAP.

THE areas here adopted are those defined and promulgated by Mr. Hewett Cottrell Watson, for the purpose of recording the distribution of British plants, and correspond with the counties of Great Britain and Ireland, with the important modifications that the larger counties are sub-divided, that a few of the smaller are united to adjoining counties, and that all detached or out-lying portions of counties are considered as forming part of the counties by which they are surrounded.

The following are the sub-divisions of the larger counties :—

1 and 2.—Cornwall W. and E., divided by the high road from Truro through St. Columb to the inland extremity of Padstow Creek.

3 and 4.—Devon N. and S., divided by the watershed line which commences at the Tamar, about mid-way between Tavistock and Launceston, passes over the ridge of Dartmoor, and joins the western canal at Tiverton.

5 and 6.—Somerset N. and S., divided by the river Parret from Bridgwater to Ilchester, the line thence curving round to the north extremity of Dorsetshire.

7 and 8.—Wilts N. and S., separated by the Kennett and Avon Canal.

10, 11, and 12.—Isle of Wight, and Hants N. and S., the latter divided by the high roads running W. and E. from Winchester to the borders of Wilts. and Sussex respectively, through Stockbridge and Petersfield.

13 and 14.—Sussex W. and E., divided by the high road from Brighton to Cuckfield, thence through Crawley to the border of Surrey.

18 and 19.—Essex S. and N., divided by the high road from Waltham and Epping to Chelmsford, thence along the river Blackwater to its mouth.

25 and 26.—Suffolk E. and W., divided by the first meridian E. of Greenwich.

27 and 28.—Norfolk E. and W., also divided by the first meridian E. of Greenwich.

29.—Cambridge, includes the Newmarket detached portion of Suffolk.

30.—Bedford, includes a detached portion of Hunts.

33 and 34.—Gloucester E. and W., separated by the Thames and Severn Canal, thence by the River Severn from the point of confluence of the canal up to Tewkesbury ; 33 includes five detached portions of Worcestershire and one of Warwickshire.

36.—Herefordshire, includes detached portions of Monmouthshire and Worcestershire (detached portions of Herefordshire are on the other hand included in Brecknockshire, Radnorshire, Shropshire, and Worcestershire).

37.—Worcestershire, includes detached portions of Herefordshire, Shropshire, Staffordshire, and Warwickshire (detached portions of this county are on the other hand included with Gloucestershire, Herefordshire, and Staffordshire).

38.—Warwickshire, includes detached portions of Gloucestershire and Worcestershire.

39.—Staffordshire, includes a detached portion of Worcestershire, which in its turn includes an outlier of Staffordshire.

40.—Shropshire, includes an outlier of Herefordshire (a detached portion of Shropshire is included with Worcestershire).

42 and 43.—Brecknockshire and Radnorshire, each includes a detached portion of Herefordshire.

50.—Denbighshire, includes the Llandudno peninsula and other portions of Carnarvonshire lying E. of the River Conway, and also the detached portion of Flintshire.

53 and 54.—Lincolnshire S. and N., divided by the Witham from its mouth at Boston to Lincoln, thence by the Foss Dyke to the border of Nottinghamshire.

- 55.—Leicester and Rutland, includes a detached portion of Derbyshire.
- 59 and 60.—Lancashire S. and W., separated by the River Ribble (the Furness district is included with Westmorland).
- 61.—York S.E. is the East Riding.
- 62.—York N.E. is the eastern half of the North Riding, the part lying east of the Rivers Wiske and Swale.
- 63.—York S.W. is the southern half of the West Riding, bounded on the north by the Leeds and Liverpool Canal, and below Leeds by the River Aire.
- 64.—York Mid W. is the northern half of the West Riding, minus the Dent and Sedbergh district.
- 65.—York N.W. is the western half of the North Riding to which is added the Dent and Sedbergh district of the West Riding.
- 67 and 68.—Northumberland S. and Cheviotland, divided by the River Coquet, and a line continued to Carter Fell from the Linn Bridge.
- 86.—Stirlingshire, includes the detached portion of Dumbartonshire.
- 87 and 88.—Perth West with Clackmannan, and Perth Mid, divided by the line of watershed which separates the tributaries of the Tay from those of the Forth.
- 88 and 89.—Perth Mid, and Perth E., separated by the Rivers Garry and Tay.
- 92 and 93.—Aberdeen S. and N., separated by the watershed line which runs E. and W. from Inverury.
- 95.—Elginshire, includes the detached portion of Inverness-shire which separates the two portions of Elginshire.
- 96 and 97.—Easternness and Westernness are constituted thus :—Inverness-shire is first divided by the line of watershed between the East and West of Scotland, continued along Loch Erricht to the Perthshire border, the eastern portion—with Nairnshire added—being called Easternness, and the western portion—with the detached portion of Argyleshire situated N.W. of Loch Linnhe—is called Westernness.
- 98.—Main Argyle is what is left of Argyleshire after the separation of Cantire, the Islands, and the portion N.W. of Loch Linnhe.
- 100.—Clyde Islands, include Bute, Arran, Cumbræ, and Ailsa Craig.
- 101.—Cantire, separated from Argyleshire by the Crinan Canal.
- 102.—Ebudes S., includes the Islands of Jura, Colonsay, and Islay.
- 103.—Ebudes Mid, includes the Islands of Mull, Coll, Tiree, Staffa, Iona, etc.
- 104.—Ebudes N., includes the Islands of Skye, Canna, Rum, Muck, Eig, etc.
- 105 and 106.—Ross W. and E., divided by the watershed parting East and West Scotland, and including some of the fragments of Cromarty county.
- 107 and 108.—Sutherland S.E. and N.W., divided by the watershed line parting the East and West sides of Scotland.
- 119.—Donegal county includes Londonderry city.
- 137 and 138.—Mayo E. and W., separated by the railway from Ballina to the head of Lough Mask.
- 139 and 140.—Galway W. and E., separated by Lough Corrib.
- 143 and 144.—Tipperary N. and S., divided by the line of watershed.
- 146 and 147.—Cork N. and S., divided by the River Lee.

In applying these definitions, it should be remembered that they were based on old maps, and on the political divisions of counties which existed at the time of Mr. Watson's work commencing. Modern maps do not show all the outlying detached portions of counties here described.

Since 1853 the following species have been added:—

| | |
|-------------------------------------|------------------------------------|
| <i>P. ancilla</i> Hanley, 1859. | <i>P. nassoides</i> Hanley, 1859. |
| „ <i>commoda</i> H. & A. Ad., 1863. | „ <i>stereoglypta</i> Sowb., 1882. |
| „ <i>livida</i> A. Ad., 1854. | „ <i>wrightii</i> H. Ad., 1865. |

It seems strange that such Gastropods as these, so nearly allied to genera which live at half-tide mark or on seaweed covered rocks in the littoral zone should be so rarely obtained. With the exception of *Macron livida* A. Ad., now common enough, and *P. plumbea* Chem. (this last, however, being very uncommonly met with in fine condition), all the species of both genera are very scarce, and several still remain unique or practically unknown.¹

* * * * *

Tryon² admitted the following species of *Pseudoliva*:—

| | |
|--|-------------------------------|
| 1. <i>P. plumbea</i> Chem. | 4. <i>P. zebrina</i> A. Ad. |
| 2. „ <i>striatula</i> A. Ad. | 5. „ <i>nassoides</i> Hanley. |
| 3. „ <i>sepimana</i> Tryon (= <i>sepi- menta</i> Rang.). | 6. „ <i>ancilla</i> Hanley. |

We will take these *seriatim*:—

1. *Pseudoliva crassa*.

Utriculus levis, edentulus Martini, "Conch. Cab.," vol. 3, pp. 391, 424, pl. 120, f. 1099, 1100.

Buccinum crassum Gmelin, "Syst. Nat.," ed. xiii., f. 3485, 1790.

„ *plumbeum* Chemnitz, xi. t. 188, f. 1806, 1807, 1795.

Pseudoliva plumbea Swainson, "Treatise Malacol.," pp. 133, 306, f. 3a on p. 82.

Eburna plumbea Sowerby, "Conch. Illust.," f. 3, 4.

Monoceros plumbeum Reeve, "Conch. Icon.," iii., sp. 8, 1846.

B. testa globoso-ovata, crassa, ponderosa, spira brevissima, acuta; anfractibus supernè tumidis, columella arcuata, basi mucronata, supernè callosa, labro tenui, simplici, dente parvo basim versus minuto, aurantio-lutea, epidermide crassa olivaceo-fusca induta. (L.A.R.).

Hab., —?

This robust, plain species is very frequently found in dead or poor condition, more rarely alive, when it is covered with a cinereous-olive epidermis, which no doubt suggested to Chemnitz the trivial name. It much resembles an *Olivancillaria*, some of the more inflated *Bullie*, or, were it not for the absence of the dorsal spiral groove on the last whorl, the *Cominella maculata* Martyn, from New Zealand. Large examples attain a length of nearly two inches. Allied to this are

¹ In searching through all the catalogues of the more important collections of mollusca dispersed during the past forty years I can only find one or two notices of *Pseudolive* being in these collections. The richest cabinet for them must have been that of Mr. Lombe Taylor, who possessed *P. sepimenta* and other great rarities.

² G. W. Tryon, "Man. Conch.," vol. 2, p. 196, vol. 3, p. 214.

certain tertiary species, some of which occur in England, in the Bracklesham and Barton beds, or the London Clay. Such are *P. obtusa* Desh. and *P. fissurata* Desh., both formerly considered as pertaining to *Buccinum*. I am much indebted to Mr. Edgar A. Smith for aiding me in the elucidation of the synonymy of this species.

Buccinum læve (Martini, "Conch. Cab.," vol. 4, p. 54, 59, pl. 125, f. 1194, 1195) is a *Nassa*.

2. *Pseudoliva striatula*.

Pseudoliva striatula A. Ad., *Proc. Zool. Soc.*, 1853, p. 184.

„ „ Sowb., "Thes. Conch.," vol. 3, p. 74, pl. 116, fig. 3, 4.

„ *striata* A. Ad., "Gen. Recent Moll.," 1858, p. 132, [*lapsu calami*].

P. testa ovata, solidi, spira brevi, anfractibus rotundatis, longitudinaliter subplicata, transversim creberrimè striata, striis confertis, epidermide fusca tecta; apertura ovata, labio lævi, subplanulato; labio intus lævi, anticè submarginato. (A.A.).

Hab., Africa (Mus. Cuming). Three examples, now in Mus. Brit.

A small, somewhat obscure species; locality probably West African. As suggested by Tryon¹ it may be but a young form of the preceding. It is, however, spirally striate throughout, although these striæ might become obsolete at maturity. Operculum distinctly Purpureoid. When the epidermis is removed, the substance of the shell, smooth and shiny, is found usually to be of a carneous or ochre hue. It occasionally is of a pale brown, fading into white.

3. *Pseudoliva sepimenta*.

Buccinum sepimentum Rang., *Mag. de Zool.*, 1832, pl. 18.

„ „ Kiener, "Mon. Coq. Viv.," pl. 18, f. 88.

Pseudoliva sepimenta (Rang.) H. & A. Ad., "Gen. of Recent Moll.," vol. 1, p. 132.

Pseudoliva sepimana (Rang.) Tryon "Man. Conch.," vol. 2, p. 196, pl. 61, f. 312.

„ *sepimenta* (Rang.) Sowb., "Thes. Conch.," pt. 116, pl. 1, 2.

Macron (Fulmentum) sepimenta Fischer, "Man. de Conch.," p. 632, 1884-7.

P. testa ovali, acuta, lævi, grisea, spira producta, acuta, anfractibus rotundatis, apertura pyriformi, intus castanea, labio externo posticè uniplicata, labio interno posticè validè uniplicato, castaneo marginato, anticè acutè producto.

A triangular hole is produced at the upper angle of the mouth by the meeting of a kind of fold or rib in the outer lip and a stronger one on the inner lip. Of a dull grey colour generally; the shell is

¹ "Man. Conch.," vol. 2, p. 196.

ornamented by a deep chestnut-brown margin to the columella, and a tint of the same colour in the mouth.¹

M. Paul Fischer in 1884 separated this species subgenerically under the name of *Fulmentum sepiantum*, his diagnosis being—

“Spire aiguë; callosité columellaire large; une forte lamelle interne, placée sur la columelle, cloisonne l’ouverture en arrière; opercule ovale, acuminé; nucléus apical. *Hab.*, Ile du Prince.”²

A very rare shell; I have only seen the example in the British Museum (Nat. Hist.). It appears to me more allied to *Pseudoliva* than *Macron*, in spite of the operculum being acuminate, with apical nucleus.

4. *Pseudoliva zebrina*.

Pseudoliva zebrina A. Ad., *Proc. Zool. Soc.*, 1853, p. 184.

„ „ Sowb., “*Thes. Conch.*,” vol. 3, p. 74, pl. 116
f. 13, 14.

P. testa ovata, solida, spira brevi, acuta, albida, lineis longitudinalibus rufo-fuscis ornata; anfractu ultimo supernè nodosoplicato, transversim sulcato, apertura ovali, labio lævi incrassato, labro intus sulcato. (A.A.). *Hab.*, Africa (Mus. Cuming).

A rare form of which I have only seen the specimen in our National Collection. It is about 0·75 inch in length, smooth, broad, with chestnut lines disposed longitudinally. Owing, no doubt, to the coloration, an affinity to *Zemira australis* Sowb., has been suggested.

5. *Pseudoliva nassoides*.

Pseudoliva nassoides Hanley, *Proc. Zool. Soc.*, 1859, p. 430.

Testa parva, solida, imperforata, ovalis, conica, fulvo-rufescens, lævigata, ultimi anfractus antice satis declivis fere quartam partem segregat sulcus latus profundus. Cingulum siphonale pallidum retusione cinguli basalís fit prominentior, spira satis producta tertiam partem longitudinis testæ implet; sutura simplex anfractus ejus 4 convexos profundè dividit; apex obtusiusculus. Apertura parva, subelliptica, antice posticeque angustata, dimidiam longitudinem testæ haud multum superat. Labium columellare crassum, album, læve, cillo pliciformi nullo posticè munitum, sed ad extremitatem anticam submultiplicatum. Long. $\frac{3}{8}$, lat. $\frac{3}{16}$ poll.

Hab., Malabaricum littus (Mus. Hanley).

The only specimen known to me bears the aspect of being fully adult. Its outer lip seems thickened externally, and the tooth-like projection over the characteristic groove is conspicuous (S.H.).

¹ Sowerby, “*Thes. Conch.*,” *Lc.*

² Fischer, “*Man. de Conchyl.*,” p. 632.

6. *Pseudoliva ancilla*.

Pseudoliva ancilla Hanley, *Proc. Zool. Soc.*, 1859, p. 429.

We now come to by far the most interesting member of this little group, and one which, from its great rarity, and the difficulty of obtaining it in good condition, seems almost unknown. It will be convenient to give in extenso the original description of the author.¹

'*Testa oblonga, conica, nitida, solida, imperforata, sublævigata, fulvo rufescens. Ultimus anfractus in medio pallescens et ventricosus; superne latè haud autem profundè, concavus; inferne lente declivis, et sulco lato, qui partem fere quartam superficiei segregat, incisus; cingulum siphonale planum cum cingulo basali vix convexiusculo confluent. Spira producta tertiam partem longitudinis testæ implet; anfractus ejus 4 haud humiles infra suturam conspicuam et profundam retusi sunt, supra eam convexi; apex obtusus. Apertura elliptico-acuminata (duos trientes longitudinis testæ fere æquat) postice callo columellari alto magno prominente et angulato angustata. Labium columellare læve, altum, convexum, falcatum, latiusculum. Long. 1 $\frac{5}{8}$, lat. $\frac{7}{8}$ poll.*

Hab., Caffrariam. *Mus.* Hanley.

'I have never seen but a single individual of this remarkable looking shell, which reminds one alike of *Bullia* and *Ancillaria*. The whorls of the spire are not twice as broad as high. The basal distinctive groove is nearly square cut; its bottom is closely traversed by wrinkles of increase, and is flat, not concave' (S.H.).

P. ancilla is figured by Mr. G. B. Sowerby,² accompanied by the following sentences:—"A very remarkable form, the true generic position of which is doubtful, having characters in common with *Pseudoliva* and *Ancillaria*. The specimen shown me by Mr. Ponsonby is 51 millimetres (just over two inches) long, and 24 mm. wide in the middle, tapering at each end; of a light reddish-brown colour, with a pale central zone. There was a specimen in the collection of the late Thos. Lombe Taylor, which was acquired by Mr. Melvill, who proposed to give it the subgeneric name of *Mariona*."³

This extraordinary shell, more akin perhaps to *Pseudoliva* than to *Macron*, seems to differ from any congener in its sloping extended spire, rapidly becoming attenuate, compressed whorls, not in the slightest degree channelled, and unusual coloration. It is likewise isolated in its only known habitat, Kaffraria, all the *Macrones* being West American, while the true *Pseudolivæ*, so far as is known, are confined to tropical West Africa. With this species are associated, in its native

¹ S. Hanley, "Descriptions of new univalve shells from the collections of Hugh Cumíng and Sylvanus Hanley," *Proc. Zool. Soc.*, 1859, p. 429-431.

² *J. Conch.*, vol. 6, p. 149, 1889, pl. 3, fig. 2.

³ This name is preoccupied, having been used for a Nudibranch by Vayssière in 1879.

seas, various *Ancille* and *Bullie*, some exhibiting a certain similitude to it in form, texture, or coloration; but all in reality far removed from it. Always found in more or less worn condition, as are so many South African mollusca, the surf-laden seas being subject to violent tempests and gales, the outer lip of *P. ancilla* is usually imperfect, and such was the condition of the specimen figured by Mr. Sowerby (*l.c.*), accordingly it is uncharacteristic.

It is not easy to say whether, in life, the surface is covered by an epidermis, but if there be one, it is probably of thin texture. The operculum is unknown; nor have the soft parts been yet studied. Notwithstanding this, I venture, on conchological grounds, to describe it as pertaining to a new genus, and would predict that justification for this step will ultimately be found. I have not yet noted any fossil form coming near this species, which stands alone, as already remarked, for peculiarity of form.

Sylvanocochlis gen. nov.

Shell very smooth, dun coloured, imperforate, fading into white in the centre of the last whorl, somewhat solid, spire attenuately fusiform, whorls compressedly flattened, not the least channelled at the sutures, mouth ovate-oblong, outer lip thin, possessing a tooth-like projection, near the base, at the point where commences the spiral groove extending over the last whorl to the columellar margin. This last almost smooth, white, shining, with a shining noded callus in the upper part.

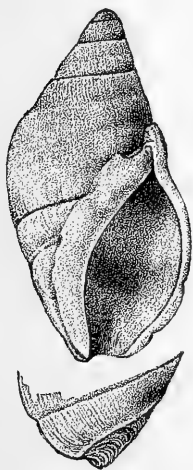
Type *S. ancilla* Hanley.

Long. 46 mm., *lat.* 25 mm. *Hab.*, South Africa (Kaffraria, Hanley).

The whorls are 5-6 in number, the two uppermost apical, smooth, somewhat bulbous, the rest compressed towards the centre, and so slightly sinuous, the last whorl below the suture compressedly constricted, thence to the base more gradually sloping, fawn coloured fading into a white indistinct fascia in the centre of the last whorl. The mouth

is channelled above, at the junction of the columellar with the outer lip.

I have seen several examples of this curious shell, but consider the one now taken for the type of the new genus *Sylvanocochlis*, though not quite perfect, more so than any other probably now extant; the outer lip being characteristic. The generic name is given in honoured memory of the describer of the species, the late Mr. Sylvanus Hanley, F.L.S.



Sylvanocochlis ancilla.

Fam. *Buccinidae*. Sub-fam. *Eburninae*.

MACRON H. & A. Ad., 1858.

'Operculum unguiculate, not purpuroid, nucleus apical. Shell solid, oblong, roughish, chalky-white, with a thick olive or black epidermis; spire elevated, whorls deeply channelled at the sutures, columella rugulose, white, a callus more or less developed at the upper part, outer lip thin, toothed near the base, this so-called tooth being at the junction of the revolving spiral groove on the last whorl, just above the base.'

In Tryon,¹ five species alone are admitted of this genus; exclusive of *M. æthiops* Reeve, erroneously referred to *Purpura*. The following is, therefore, a corrected list:—

- | | |
|---|----------------------------------|
| 1. <i>M. kellettii</i> A. Ad. | 4. <i>M. livida</i> H. & A. Ad. |
| 2. <i>M. æthiops</i> Reeve. | 5. <i>M. commoda</i> H. & A. Ad. |
| 3. <i>M. wrightii</i> H. Ad. | |
| (including <i>M. stercoglypta</i> Sow.) | |

1. *Macron kellettii*.

'*Pseudoliva kellettii* A. Adams, *Proc. Zool. Soc.*, 1853, p. 185.

„ „ Sowb., "Thes. Conch." (*Pseudoliva*), pl. 116, f. 12.

Macron kellettii A. Adams, "Gen. Recent Mollusca," vol. 1, p. 132.

P. testa ovata, solida, subperforata, epidermide fusco-villosa tecta; spira prominula, anfractibus rotundatis, sutura canaliculata, anfractu ultimo transversim sulcato, sulcis posticis evanidis, antice valde distinctis, unica profunda, in dente sulcato, ad labrum, terminata; apertura ovali, columella posticis callosa, antice flexuosa, producta, labro posticis inflexo, anticis sinuato-dentato.

Hab., ———?

'I am indebted for this species to Professor Edward Forbes, who, although himself describing the shells collected during the voyage of the *Herald* and *Pandora*, insisted upon my describing the species when he heard I was preparing a monograph of the genus' (Arthur Adams).

This fine and still rare species comes from the Gulf of California, when in good condition it is always completely covered with a dark, thick epidermis, the shell itself being white. The surface is spirally encircled with grooves, those towards the base being the most pronounced, especially in one instance, the upper ones being very obscure—the rounded sutural canaliculation is also noteworthy. A fine example longitudinally measures nearly 3 inches.²

¹ Tryon, "Man. Conch.," vol. 3, p. 214.

² The specimen in Coll. Dennison, a very fine one, with operculum, was sold at Stevens' Auction Rooms on 24th April, 1865, on the first of the six days' sale, being numbered lot 110. It realized £5 5s. od., and is now in the Liverpool Museum.

2. *Macron æthiops*.¹

Buccinum Æthiops Reeve, Conch. Icon., vol. 3, 1847, pl. 13, f. 108.

"*Buccina testa ovata, spira breviuscula, anfractibus supernè late plano-depressis, regulariter costatis, costis grandibus convexis interstitiis latiusculis, excavatis; columella et apertura fauce subcorrugatis aut liratis; alba epidermide cornea anthracina induta.*"

"The Blackamoor *Buccinum*."

Hab., ———?

'A remarkable species, approximating in form and general character to the *Purpura trochlea* and its congeners' (L. S. Reeve).

The specimen in my collection is 2·5 inches in length, thick, black, five-whorled, canaliculate at the sutures, last whorl transversely eight-furrowed, the furrows uniform, clearly cut and defined, ribs smooth, mouth oblong-oval, interior white, outer lip with tooth-like projection near the base, the spiral furrow or groove at the point of junction being slightly deeper than the other sulci; columella white, slightly bulbous at the upper part. There are four examples in the Manchester Museum and several in our National Collection.

Mr. G. W. Tryon² is entirely erroneous in his conclusions as to this large and handsome species being identical with *Purpura cingulata* L. He had evidently never seen the shell; this indeed not being surprising, as it is very uncommon, but it is always unsafe to draw definite premises from a figure, especially, as in this instance, one taken from a poor and imperfect specimen, not exhibiting any of the salient labial characters, though it be the type. A comparison of the *Purpura* with the *Macron* shows the spiral ribs to be of quite a different character, and the mouth and lip of *M. æthiops* resemble no *Purpura* at all, but are almost identical with those of *Macron kellestii* A. Ad. It is West American in distribution.

3. *Macron wrightii*.

Macron wrightii H. Adams, *Proc. Zool. Soc.*, 1865, p. 853.

"*M. testa ovato-trigona, solidissima, subumbilicata, alba; spira brevi, anfr. 4, convexiusculis, superne tabulatis, anfractu ultimo magno, transversim sulcato, sulcis posticè evanidis, antice tribus valde distinctis, sutura canaliculata, apertura ovali, $\frac{2}{3}$ totius longitudinis teste; columella arcuata, callo posticè copioso, canali brevi, recurvo; labro posticè inflexo, anticè sinuatodentato. Long. 75, lat. 52 mm.*"

Hab., Coast of Patagonia (Coll. mea).

'The specimen from which the above description is taken was obtained, I am informed by Mr. Wright, from the coast of Patagonia. It is very much beach-worn, but when in a fresh state was, I have no

¹ *Macron cheesmani* Hutton, a small species from New Zealand, of which more details are wanted, seems nearest to *M. æthiops*, which it resembles in its deeply channelled spiral ridges. There is a specimen in the National Collection.

² "Man. Conch.," vol. 3, p. 214.

doubt, covered with a thick dark epidermis like the other species of the genus. *M. wrightii* differs from *M. kellettii*, which it most resembles, in being larger and more solid, and in its short spire and trigonal form,

'The genus *Macron* has hitherto been considered a subgenus of *Pseudoliva*, but having recently seen the operculum of *M. kellettii*, which is unguiculate, while that of *P. lævis* (the type of *Pseudoliva*) is purpuroid, *Macron* must be separated and take rank as a genus.' (H. Adams.)

3A. *Macron stereoglypta*.

Pseudoliva (Macron) stereoglypta Sowb., *Proc. Zool. Soc.*, 1882, p. 119.¹

'Shell angularly ovate, ponderous, white; spire rather short, turreted; whorls 5, convex, rounded at the angle, depressed at the suture, with a prominent ridge between the suture and the angle; the last whorl has the upper angle somewhat rounded, and a second equally rounded angle a little below, sides slightly convex, with three rather broad deep grooves near the base; umbilical ridge thick and broad. Aperture oblong-oval, smooth, white within. Lip very thick at the upper part. Columella furnished with a callosity, which is thickened into a tubercle at the upper part and depressed so as to cover the umbilicus at the lower. Length 75, width 51 mm. Length of aperture 43, width 21 mm.

'The specimen is, unfortunately, in bad condition, the outer surface being much worn and the lip imperfect; but it is certainly worthy of notice, being the largest species of a very limited genus, and of a bold and striking outline, entirely different from the two largest species hitherto known; *P. kellettii* and *P. æthiops*.

'I have not attempted to describe the surface of the shell, on account of its condition, but there are faint indications of obsolete sulci, with a sort of malleation between.' (G.B.S.)

Now it will be patent to all who take the trouble to examine the shell of *P. stereoglypta* Sowb., at present unique in my collection, and at the same time compare the descriptions here given *in extenso* together of Messrs. H. Adams and Sowerby, that they both apply to the same individual specimen. In all points, *e.g.*, form, colour, size, certain peculiarities of contour, condition of specimen, etc., the two accounts seem almost exactly to correspond, and with little doubt the new recently proposed name, described seventeen years after *wrightii*, must sink into synonymy. In locality, indeed, there is alone a discrepancy. On the authority of the late Mr. Bryce M. Wright Patagonia is given for *M. wrightii*, while California is credited as the birth place of *M. stereoglypta*. In all probability this latter is correct;

¹ G. B. Sowerby, jr., "Descriptions of new shells in the Collection of J. Cosmo Melvill," *Proc. Zool. Soc.*, 1882, p. 117-121.

there are many points of similitude between this heavy, thickly shouldered species and the more elegant *M. kellettii*.

4. *Macron livida*.

Pseudoliva livida A. Ad., *Proc. Zool. Soc.*, 1854, p. 136.

'*P. testa ovali, cinerascens, livida, spira obtusa, apice erosa, anfractibus 3-4, convexiusculis, transversim crebrè striatis, anfractu ultimo anticè oblique-sulcato, sulco unico valde impresso; apertura ovali, columella alba, postice callo spirali instructa, anticè oblique plicata, canali brevi, aperta, labro margine anticè unidentato, intus lirato.*

Hab., West Coast of Africa. Mus. Cuming.

'Most like *P. sepimentata* Le Guill, but the callous spiral ridge is less prominent, the inner lip is without the dark mark, the columella is less produced anteriorly, the spire is obtuse and eroded, and the whorls are rounded.' (A.A.)

The locality as given above by Adams is entirely erroneous; it is the most common of the genus, and not rare off the Californian coast.

My examples, four in number, average 22 mm. in length. It is entirely covered with a thick, swarthy epidermis, the whorls being roundly channelled at the sutures. The mouth and columella, the latter possessing a callus at the upper part, are shining white. Occasionally the mouth is stained with reddish-brown. The operculum is unguiculate.

5. *Macron commoda*.

Pseudoliva commoda H. & A. Ad., *Proc. Zool. Soc.*, 1863, p. 430.

'*P. testa ovato-fusiformi, epidermide fusca velutina incrassata oblecta; spira aperturam æquante, anfractibus 5, convexiusculis, transversim obsoletè liris, ultimo elongato anticè sulco profundo spirali, in dentem brevem desinente instructo, sulcis tribus spiralibus ad basim ornato; regione umbilicari impresso, lira valida spirali circumcincto; apertura ovata, intus fusca, labio albo, crasso, convexo, superne callo instructo, inferne subtortuoso; labro intus lirato, margine acuto, intus albo.*

Hab., ———? (Coll. Tyler).

'This curious shell belongs to the same group to which *P. kellettii* A. Ad., belongs, and to which the name *Macron* has been given by the authors.' (H. & A. Ad.)

I can obtain no more information as to this shell.

* * * * *

EXCLUDED SPECIES.

Pseudoliva australis Sowb., *Conch. Ill.*

" " Sowb., "Thes. Conch.," vol. 3, pl. 216, f. 7-8.

Eburna (Zemira) australis Adams, "Gen. Recent Moll.," 1858, vol. 1, p. 132.

'P. testa ovali, pallida, fulvo-maculosa, spiraliter leviter striata; spiram producta, ad suturam profunde canaliculata, anfractibus ad suturam angulatim elevatis; apertura ovata, anticé vix emarginata.

Till recently, this species was considered a link between *Macron* and the typical *Latrunculi* (*Eburnæ*). But Mr. Charles Hedley having, in 1899, examined the anatomical details, is inclined to propose its transference to the Struthiolariidæ.¹ The operculum appears buccinoid, but the shell itself possesses the revolving spiral canaliculation near the base of the last whorl, ending in a tooth-like projection on the outer lip, this being unlike the *Latrunculi*, though resembling many *Ancillæ*, and of course, *Macron* and *Pseudoliva*. The surface is also closely spirally sulcose throughout, while the chestnut blotches and maculations are, after all, not of the same character in the *Latrunculi*, and, undoubtedly, *Zemira* will stand as a monotypic genus on its own merits. Native of Australian seas.

* * * * *

DOUBTFUL SPECIES.

Pseudoliva espinata Rang.

„ *monoceros* Gray. A. Adams, *Proc. Zool. Soc.*, 1853, p. 214.
‘mihi ignota’ (A.A.).

„ *plicata* Sowb. A ‘nomen nudum’ only, undescribed.

* * * * *

We would repeat, in conclusion, that any arrangement of the *Pseudolivæ* is as yet, merely tentative and artificial, and will continue to be so till the whole have been studied anatomically.

Turricola terrestris and Helix virgata.—I visited at the beginning of September the unique British habitat of *Turricola terrestris* and found (1), that it is undoubtedly spreading its borders; (2), that it was so numerous, that as a test I stood with one foot on the road and another on the chalky bank, and without moving a foot I gathered sixty-two specimens, which I returned; (3), that it found congenial food in bits of paper on the wayside, eating holes therein as heartily as did *Helix lucasi* when in my study; (4), that where it had strayed on to a clover-field it had grown considerably in size and in altitude; (5), that I could see none in two places where I had tried to establish a colony. It may have been that I fell into what is, I believe, a common mistake, namely, to transplant only adult specimens that will not again produce eggs. This year I have experimented with immature specimens in another place, and will report next year with what effect. *Helix virgata* var. *radiata* is abundant and fairly fine in Rye. It is, as regards Kent, mainly a Romney Marsh seaside form. I have not found it north of Hythe nor south of Rye. I looked in vain for var. *alba* in many places, and at last found a colony of finer specimens than usual a few yards from where I was staying. Have any conchologists noticed a dearth of snails this year? And if so, to what cause do they attribute it? *H. nemoralis* was rare in several spots where it used to abound. *H. cartusiana* I could not find on Barham Downs where it used to be in plenty. —J. W. HORSLEY, St. Peter's Rectory, Walworth, S.E. (*Read before the Society*, November 12, 1902).

¹ Hedley, *Records Austr. Mus.*, vol. 3, p. 118.

ADDITIONAL NOTES UPON THE LAND AND FRESH- WATER MOLLUSCA OF SURREY.

By CHARLES PANNELL, JR.

(Read before the Society, December 10, 1902, and May 15th, 1903).

SINCE the publication of my paper on the Surrey mollusca (pp. 168-179 *antea*) a considerable number of new records have come in. These are given below and will serve to render that list more complete and therefore of greater service to collectors.

It is interesting to note that certain species previously included upon the authority of the "Census" only are now given definite localities.

Many thanks are due to Mr. W. Whitwell, F.L.S., Mr. A. S. Kenard, F.L.S., Mr. Russell Harrison, and Mr. A. Reynell for their valuable assistance.

Arion ater (L.). Shirley. 9—Addington, Chelsham, Farley Heath.

A. subfuscus Drap. 9—Addington.

A. hortensis Fér. 3—South Norwood; 9—Addington, Tatsfield.

A. circumscriptus Johnst. 9—Mickleham Downs, Epsom.

Amalia sowerbyi Fér. has turned up at Haslemere, 8, and is reported to be "very common" in suburban gardens.

Limax maximus L. 9—Tatsfield. Mr. Taylor, in part 8 of his "Monograph of the Land and Freshwater Mollusca of the British Isles," records

v. **concolor** Pini. Farnham.

v. **cellaria** D'Arg. 9—Croydon.

v. **ferussaci** Moq. Sutton.

L. flavus L. 3—South Norwood; 8—Haslemere (Tennyson's Lane), Shottermill (Pitfold Hollow).

Agriolimax agrestis L. 3—South Norwood; 8—Brook; 9—Tatsfield, Addington, Chelsham.

Testacella haliotidea Drap. 9—Warlington. Mr. Taylor ("Monograph," pt. 8, p. 10) reports the species from Nutfield, Leatherhead, Sutton, Dorking, Reigate, and Kew.

T. scutulum Sby. Mr. Taylor gives Lambeth as the original locality in Surrey, and Nutfield, Sydenham, Croydon, Dorking, Kew, Headley, and Mitcham ("Monograph," pt. 8, p. 19).

Vitrina pellucida Müll. 1—East Horsley; 9—Chelsham, Mickleham, Titsey, and Crohamhurst, Croydon.

Hyalinia cellaria Müll. 1—Box Hill, Ranmore, Riddlesdown; 2—Tooting, Mitcham, Wimbledon; 3—South Norwood, Walworth; 9—Farley, Addington, Chelsham, Titsey, Headley Lane.

H. nitidula (Drap.). 2—Tooting; 9—Leatherhead, Tatsfield, Addington, Croydon [*v. nitens*].

H. alliaris (Miller). 1—East Horsley.

H. radiatula (Alder). 9—Addington.

H. pura (Alder). 9—Addington, Tatsfield.

H. crystallina (Müll.). 9—Mickleham Downs, Sanderstead, Tatsfield.

H. fulva (Müll.). 9—East Horsley.

H. rotundata Müll. 1—Ranmore, Box Hill; 2—Tooting, Wimbledon; 8—Brook; 9—Mickleham, Titsey, Addington, Chelsham, Farley, Tatsfield, and reported as "generally abundant in the Chalk district."

H. aculeata Müll. 9—Mickleham, Titsey.

H. pulchella Müll. 2—Tooting; 9—Mickleham, Epsom, Titsey, Addington, Farley.

H. lapicida L. 9—Woldingham, Addington, Burford Bridge.

H. obvoluta Müll. 7—Norbury Park is given as another Dorking locality for this rare species.

H. pomatia L. 1—Ranmore, Box Hill; 9—Chelsham, Mickleham, Headley, Chipstead, Warlingham.

H. aspersa Müll. Distribution general in districts 2, 3, 8, and 9.

H. nemoralis L. 1—Ranmore; 4—Great Woodcote; 9—Epsom, Headley, Mickleham, Addington.

H. hortensis Müll. 1—Effingham, Ranmore; 3—Beddington; 9—Mickleham, Sanderstead, Addington.

H. cantiana Mont. 2—Mitcham; 8—Brook; 9—Crohamhurst, Addington, Abinger, Tatsfield, Titsey.

H. rufescens Penn. 1—Ranmore; 2—Tooting, Mitcham; 3—South Norwood; 9—widely distributed.

v. albida and *albo-cincta* occur at Haslemere, 8.

H. hispida L. 2—Tooting; 8—Grayswood; 9—generally distributed.

H. granulata Alder. 9—Sanderstead.

H. itala L. 7—Abinger; 9—Addington, Titsey.

H. caperata Mont. 1—Riddlesdown; 7—Abinger; 9—Addington, Titsey.

H. virgata Da Costa. 7—Abinger, Hammer; 9—Addington, Crohamhurst Wood.

Buliminus obscurus (Müll.). 7—Abinger; 9—Addington, Tatsfield; 10—Limpsfield.

Pupa muscorum (L.). 9—Purleydowns, Mickleham, Riddlesdown.

Balea perversa (L.). 9—Crohamhurst.

Clausilia perversa (Pult.). 9—Addington, Farley, Titsey, Tatsfield, White Downs, Crohamhurst.

v. **nigrescens**. 8—Grayswood.

C. rolpheii Gray. 9—Farley Heath.

C. laminata (Mont.). 9—Addington, Crohamhurst, Tatsfield, Titsey, Mickleham, and White Downs.

Cochlicopa lubrica (Müll.). 2—Tooting Common; 9—Shirley, Mickleham, Netley Heath, Addington, and Tatsfield.

Cæcilioides acicula (Müll.). 9—Mickleham.

Succinea putris (L.). 9—Gatton.

v. **vitrea** Moq. 2—Kew.

S. oblonga Drap. 3—Battersea, writes Mr. Kennard, was the locality of this species (specimen in the British Museum).

S. elegans Risso. 2—Kew.

Carychium minimum (Müll.). 9—Woldingham, Mickleham.

Planorbis fontanus (Lightfoot). 2—Kew, ditch by river.

P. nautilus (L.). 2—Richmond Park.

P. albus (L.). 2—Mitcham, Wimbledon Common, Leatherhead, Newdigate.

P. spirorbis Müll. 2—Mitcham.

P. vortex (L.). 2—Mitcham, Kew, ditch by river, Collierswood; 9—Gatton.

P. umbilicatus Müll. 2—Mitcham, Kew.

P. corneus (L.). 2—Kew, Collierswood; 6—Guildford (R. Wey).

P. contortus (L.). 2—Mitcham, Kew, Collierswood; 7—Dorking.

Bullinus hypnorum (L.). 2—Kew Lake.

Physa fontinalis (L.). 2—Kew Lake and ditch by River Thames.

P. acuta Drap. 2—Found by Mr. Whitwell in the *Victoria regia* tank, at Kew (warm), with *Pontideria* and other tropical plants.

Limnæa peregra (Müll.). 2—Tooting, Mitcham, Wimbledon; 9—Leatherhead; 10—Newdigate.

L. auricularia (L.). 2—Kew.

L. stagnalis (L.). 2—Kew; 9—Gatton.

v. **fragilis** (L.). 2—Kew.

L. palustris (Müll.). 2—Mitcham, Kew, Collierswood.

Ancylus fluviatilis Müll. 2—River Mole, Leatherhead.

Cyclostoma elegans (Müll.). 1—Box Hill; 9—Upper Wallingham, Addington.

Neritina fluviatilis (L.). 2—Kew (Thames); Putney (Thames).

Viviparus contectus (Millet). 2—Kew (Thames), Guildford (River Wey).

Bythinia tentaculata (L.). 2—Kew, Mitcham, Collierswood, River Mole.

B. leachii (Shepp.). 2—Collierswood, Kew, Richmond, River Mole, Leatherhead.

Valvata piscinalis (Müll.). 2—Richmond Park, Collierswood.

V. cristata Müll. 2—Richmond Park, Collierswood, Leatherhead.

Unio tumidus Phil. 2—River Thames, Putney and Kew.

U. pictorum L. 2—River Thames, Putney and Kew; 9—River Mole, Mickleham.

Sphærium corneum (L.). 2—Mitcham, Kew, Collierswood.

S. rivicola (Leach). 2—River Thames, Kew.

S. pallidum Gray. 2—Kew; 9—Gatton.

Pisidium amnicum (Müll.). 9—Riddlesdown.

Foreign Distribution of *Helix virgata*, *H. caperata*, and other British Mollusks.—Having spent some time during the last two summers in places where conchologists cannot be said to jostle each other, some of my records may be interesting. Last year, in Sicily, I spent some days roaming about the ruined Greek temples at Girgenti, and though I found *Helix aspersa* and *H. pisana* in abundance, as well as a shell indistinguishable from *H. acuta*, I found no trace of *H. virgata* or *H. caperata*. *H. aspersa*, *H. vermiculata*, and *H. aperta* are commonly sold in Girgenti as food. I also had a fortnight's wandering over the desolate shore of Karkinit Bay in the Crimea towards Perikop, and here the only two land shells were *H. virgata* and *H. caperata*. This year I sought for them along the Russian coast at Ghenitshesk in the Azov, but found neither them nor any other terrestrial mollusk whatever. Jeffreys says:—"The foreign distribution of *H. virgata* appears to be confined to France, Portugal, Italy, Greece, and the sea-board of North Africa." Having met with it in the Crimea, we may expect it in Asia Minor and Palestine, as this summer I found it among the old forts of Alexandria, and a large form of it may always be found in the market at Algiers. Mr. E. A. Smith informs me that Pfeiffer ("Monographia Heliceorum," vol. 1, p. 204, and vol. 5, p. 204), quotes Spain, and later gives the Canary Islands. *H. caperata* has a wider continental distribution, as far east as Palestine, and twenty years ago I found it further east at Bagdad. The only marine mollusk that I could find in the brackish water of the Azov was a small *Cardium*, 0.75 inch in diameter, akin to our *Cardium edule*. Along the western shore it was so abundant, that most of the sand is composed of it. I could not, however, secure a living or even a perfect specimen. This same cockle is ubiquitous in the Black Sea and also came up in anchor mud in the Bosphorus.

—LIONEL E. ADAMS (Read before the Society, April 8, 1903).

PROCEEDINGS OF THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN & IRELAND.

319th Meeting, April 8th, 1903.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted :

"Marine Mollusca of the Pacific Coast of Canada," by the Rev. G. W. Taylor (from Mr. R. D. Darbishire); and the usual periodicals received in exchange.

Candidates Proposed for Membership.

John Hawkins, J.P., 35, Avenue Road, Grantham.

Henry Preston, F.G.S., Hawthornden Villa, Spittlegate, Grantham.

Robert Worsdale, 75, Dudley Road, Grantham.

Papers Read.

"*Paludestrina anatina*, a species new to Britain," by J. R. le Brockton Tomlin.

"The foreign distribution of *Helix virgata*, *H. asperata* and other British Mollusks," by Lionel E. Adams.

Exhibits.

By Mr. L. St. G. Byne: Examples of *Cypræa cylindrica*, type and variety, from New Caledonia, and *C. tabescens*.

By Mr. E. H. Turner: *Cypræa tigris* var. *lineata*, and a series of *Bulinus ovatus*, and its var. *chionostomus* from Macahé, Brazil.

By Mr. J. R. le B. Tomlin: *Paludestrina anatina* and *P. similis* to illustrate his paper, and for comparison; and a curiously malformed *Planorbis albus*.

By Mr. J. W. Jackson: *Hyalinia excavata* and var. *vitulina*, *H. alliaris* var. *viridula*, *Pupa cylindracea*, *Helix pulchella*, *H. hispida* var. *alba*, and *Ancylus fluviatilis* collected recently at Marple, Cheshire; *H. hispida* var. *albida* from Gatley Carrs, Cheshire; *Pupa cylindracea* Miller's Dale, and The Winnats, Castleton, Derbyshire, also var. *curta* from the latter locality; *H. aspersa* var. *minima*, a very small form, from the south of France; *Pupa michaudi* from Lille, France; *Perrinia girardoti* from Brest; and *Paludestrina stagnalis* from Drogheda, Ireland.

By Mr. C. W. Vincent: *Petricola pholadiformis* from Walton-on-Naze.

320th Meeting, May 13th, 1903.

Mr. Charles Oldham in the chair.

Donations to the Library announced and thanks voted :

The usual periodicals received in exchange.

New Members Elected.

John Hawkins, J.P., 35, Avenue Road, Grantham.

Henry Preston, F.G.S., Hawthornden Villa, Spittlegate, Grantham.

Robert Worsdale, 75, Dudley Road, Grantham.

Candidates Proposed for Membership.

Miss J. E. Linter, Saville House, Twickenham.

Henry Willoughby Smallwood, Holly Mount, Church Road, Moseley, Birmingham.

James Clarence Smallwood, Holly Mount, Church Road, Moseley, Birmingham.

Letter Read

From Mr. R. Welch calling attention to the facilities offered by the laboratory of the Ulster Fisheries and Biology Association on Belfast Lough and conveying an invitation to any members of the Society who may be in the neighbourhood to visit and make use of it.

Papers Read.

"Pockets of Land-shells, Bannmouth Dunes, Portstewart," by R. Welch.

"A Standard of Value for Exchanges," by the Rev. J. W. Horsley.

"Additional Notes upon the Land and Freshwater Mollusca of Surrey," by Charles Pannell, jr.

Exhibits.

By Mr. R. Welch: A number of fine photographs and drawings to illustrate his paper, also a quantity of the rich material from the "shell-pockets" of Portstewart, which was afterwards distributed amongst the members present.

By Mr. C. Oldham: *Helix hortensis* and *H. arbustorum* var. *fusca* from Cunningsburgh, Shetland.

By Mr. J. W. Jackson: *Pupa anglica* from Compstall Wood; *Vitrea rogersi* and a greenish variety from Oakwood, Cheshire; a fine series of *Unio pictorum* obtained during a recent draining of the Marple canal for repairs, and a number of varieties of *Cypræa tigris* from Cape York.

By Mr. R. Cairns: A fine series of choice examples of *Cypræa xanthodon* Gray, *C. pyriformis* Gray, *C. goodalli* Gray, *C. stolidus* var. *diauges* Melv., *C. cribraria* var. *exmouthensis* Melv., *C. cumingi* Gray, *C. nigropunctata* Gray, *C. petitiana* Crosse and Fischer, *C. physius* Brocchi, *C. becki* Gask., and *C. chrysalis* Kien.

By Mr. R. Standen: *Hybocystis rochebruni* Mabile, from Tonkin.

Mr. F. Taylor distributed *Pupa anglica* from Compstall amongst the members present.

321st Meeting, June 10th, 1903.

Mr. Edward Collier in the chair.

Donations to the Library announced and thanks voted:

New Members Elected.

Miss J. E. Linter, Saville House, Twickenham.

Henry Willoughby Smallwood, Holly Mount, Church Rd., Moseley, Birmingham.

James Clarence Smallwood, Holly Mount, Church Rd., Moseley, Birmingham.

Candidate Proposed for Membership.

A. D. Darbishire, B.A., Zoological Department, Owens College, Manchester.

Paper Read.

"Scalidae of the Persian Gulf and North-Arabian Sea, with Descriptions of Sixteen New Species," by J. Cosmo Melvill and R. Standen.

Exhibits.

By Mr. J. W. Jackson: Series of *Dreissensia polymorpha* and *Neritina fluviatilis*, from Canal at Ashton, near Preston; *Helix hispida*, *Hyalinia radiatula*, *H. nitida*, and very large *Limnæa peregra*, from Poynton, Cheshire.

By Mr. J. Ray Hardy: *Hyalinia excavata*, from Sherwood Forest, Nottingham.

By Rev. L. J. Shackleford: A fine series of *Liguus fasciatus* Müll. and var. *crenatus* Swains., from Miami, Florida; also some remarkably ventricose specimens of *Lucina columbella* Lam., from St. Vincent, Cape Verde.

By Mr. C. H. Moore: *Limnæa auricularia* and *Sphaerium corneum*, from Middlewood; *Planorbis carinatus*, *P. albus*, *Pisidium nitidum*, and *Limnæa truncatula*, from Stalybridge; *Helix lapicida*, *H. concinna*, *H. rufescens*, *H. rotundata* var. *turtonæ*, and *Vitrina pellucida*, from Castleton, Derbyshire.



BIBLIOGRAPHY.

(LIMITED TO WORKS RECEIVED BY THE SOCIETY'S LIBRARIAN).

The Nautilus, vol. 16, no. 12, April, 1903.

"Mollusks occurring in Southern California," by R. E. C. STEARNS [*Limax maximus*, *Punctum conspectum*, *Helix aspersa*]. "Descriptions of new Japanese land shells," by H. A. PILSBRY and Y. HIRASE [*Chloritis*, *Eulota*, *Trishoplita*, *Arinia*]. "Illustrations of some Japanese land shells," [plate of spp. described during the last year or two]. "Habits of *Acanthopleura granulata*," by S. H. HAMILTON [adhere tightly to rocks when wave comes and rise afterwards to let water circulate round gills]. "Temple Prime," by S. R. ROBERTS [obituary notice].

Journal de Conchyliologie, vol. 50, no. 4, 1902.

"Note sur quelques espèces du genre *Pecten*, nouvelles ou mal connues," by A. BAVAY [*P. vescoi*, hab. ?, *P. loudeini*, New Caledonia, nn. spp., figd.]. "Description d'une espèce nouvelle du genre *Marginella*," by A. BAVAY [*M. fischeri*, hab. ?, figd.]. "Description d'une *Oliva* (*O. rubrolabiata*) nouveau provenant des Nouvelles Hébrides," by H. FISCHER. "Critical Notes on Hervier's Monograph of the Columbelloidea of New Caledonia, with *C. hervieri* nom. nov.," by S. PACE. "Une grande *Venus* (*V. fallax*) du miocène supérieur de l'Anjou," by G. F. DOLLFUS.

Journal of Malacology, vol. 10, no. 1, March, 1903.

"Malacological Notes," by E. R. SYKES [*Plicaxis* n.n. for *Rhodina* de Morgan nec Guenée; *Leptachatina henschawi* n. sp., Hawaii; *Tortulosa* preferred to *Cataulus*, latter a subgen. of the former]. "Supposed new species of *Helicina* (*H. gemma*) and *Bulimulus* (*B. nubilus*) from Costa Rica," by H. B. PRESTON. "A classified list of the helicoid land shells of Asia, part 5," by G. K. GUDE [xii. Further India, excl. Burma]. "On some species of Slugs collected by Mr. Fruhstorfer," by W. E. COLLINGE [5 spp. previously described, figured]. "Notes on Slugs and slug-like Molluscs," by W. E. COLLINGE.

Journal of Applied Microscopy and Laboratory Methods, vol. 6, no. 4, April, 1903.

"A new agent [copper sulphate] for use in tide pool collecting," by F. M. CHAMBERLAIN.

Transactions of the Royal Society of South Australia, vol. 26, part 2, 1902.

"Descriptions of new species of Mollusca from the miocene limestone, near Edithburg," by H. BASEDOW.

The Annals of Scottish Natural History, no. 46, April, 1903.

"*Helix lamellata* Jeff., in Midlothian, and *Planorbis spirorbis* Müll., in Fife," by WILLIAM EVANS.

The Naturalist, no. 555, April, 1903.

"*Testacella scutulum* in North Lincolnshire," by the Rev. E. A. WOODRUFFE-PEACOCK. "Yorkshire *Fusi*," by W. C. HEY [*F. islandicus* recorded from Yorkshire coast is probably *F. gracilis*].

The Irish Naturalist, vol. 12, no. 4, April, 1903.

"A new Irish *Vertigo* (*V. heldi*?)," by BROCKTON TOMLIN.

Memoirs of the Royal Society of South Australia, vol. 2, part 1.

"The cretaceous Mollusca of South Australia and the Northern Territory," by R. ETHERIDGE, Junr. [Many nn. spp. figured on 7 pls.].

Notes from the Manchester Museum, no. 14.

"Notes on the type specimen of *Loligo eblanæ* Ball," by W. E. HOYLE (*Mem. Manch. Lit. and Phil. Soc.*, vol. 47, no. 9, 1903) [*Todaropsis veranyi* a synonym of *T. eblanæ*].

POCKETS OF LAND-SHELLS, BANNMOUTH DUNES, PORTSTEWART.

BY R. WELCH.

(Read before the Society, May 13, 1903).

A SMALL area of County Derry will be noticed on a map to the east of the River Bann; this is known as the north-east Liberties of Coleraine. Jutting out due west of this and north of the mouth of the river, may be seen a little point; this is covered with high sand-dunes, long famous for the remains of pre-historic settlements and the many stone implements found there. At the eastern end of the point the dunes are more permanent than further west; there are large areas of mossy sward, and close to the river marshy areas with a most luxuriant vegetation, ideal habitats for many of our smaller and rarer land-shells. The sward here is one of the main stations in Ireland for *Helix intersecta* (= *caperata*), and it was while collecting this species, about ten years ago, that I found in the dune hollows close to this moist area a number of fine shell "pockets."¹ These nature-winnowed little collections of small shells should never be ignored for they often contain (and this may not show till the mass is sifted) large quantities of *Vertigoes*, the smaller *Hyalinæ* and *Helices*, and in the late summer or autumn a proportion of these may be alive. *Vertigo angustior*, *Helix pulchella*, *H. costata*, and sometimes *H. aculeata* abound in these pockets with an occasional *Acme*, the species and their relative abundance depending on the nature of the feeding-ground fringing the sand-hills. For instance, *Vertigo pusilla* and its var. *albina* (the latter first found by Mr. Standen in a Portsalon "pocket") are more plentiful at Portstewart than anywhere else in Ireland, except perhaps Narin dunes, West Donegal.²

Finding myself on these Bannmouth sand-hills a few days ago, I searched in the usual places, the dune-hollows, or rather some little plateaus close to a hollow, for some pockets, in vain; I was not surprised at this, as I had never found these in the winter or early spring. Yet it was evident there must be accumulations of shells somewhere, as the higher dunes from their ragged summits, with marram grass root-stocks, etc., all felted together, had evidently undergone unusual denudation this winter, probably during the late cyclone, setting free many old shell-pockets. Leaving the low ground and climbing among the high loose dunes, Mr. R. Ll. Praeger and I soon came on a ridge which was growing on the eastern side from rapid æolian erosion on the west. Masses of *Psamma* roots had collected here and there

¹ *Irish Naturalist*, vol. 7, March, 1898, pp. 78 and 81

² Farran, *op. cit.*, vol. 8, August, 1899, p. 184.

among growing plants, and arrested by these in their downward course on the lee side of the dune were about twenty fine little pockets of shells. These were collected under conditions which kept them together, on the side of a steep dune, an impossibility in dry summer weather, when the pockets caused by wind-eddies are formed. As usual, no examples of *Vertigo* were to be seen, but I knew they were there, so as the material was too damp to sift on the spot, I brought about three pints away in a bag, and it is the shells sifted out of this I send for the acceptance of the members, to give them an idea of the richness of our Irish dune fauna, so far as mollusca are concerned. It must not be supposed that all these dead shells are dull and opaque, many fine fresh specimens occur. I know conchologists who have never yet been fortunate enough to find good pockets, but they are not always present. Very wet weather and very windy dry weather are unfavourable to their accumulation, and the conditions also vary with the character of the dunes. It was near this that Mr. Lionel E. Adams collected the first Irish specimen of *Vertigo alpestris*; this I have not so far been able to find in these particular pockets, though it lives in dunes a few miles to the eastward. Perhaps some of those who examine this material may be more fortunate. Very pale coloured *V. pygmæa* occur which at first glance might be mistaken for it.

After dry windy weather any ponds in the dune-hollows should be carefully examined, as these sometimes have nice floatings of the smaller species collected as a fringe along the lee-side, the sand sinking. Some of what I send were collected in this way, and Mr. Praeger's fine collection of *Vertigines* from Bundoran¹ was found naturally floating along the dune margin of the River Erne. Here, three years ago, I saw an incoming tide quietly floating up large quantities of small shells, including many specimens of *Vertigo* that had been blown off the sand-hills on the strand during very windy weather. I found twenty-four species in all in the Bannmouth pockets, and among these the following:—*Hyalinia pura*, *Helix aculeata*, *H. pygmæa*, the white-shelled forms of *Pupa muscorum*, and *P. cylindracea* (not merely bleached specimens), *Vertigo angustior*, extremely plentiful, *V. pygmæa*, *V. substriata*, *V. antivertigo*, and both type and var. *albina* of *V. pusilla* in moderate quantities.

It is curious to find fair numbers of *Clausilia bidentata* in this way, and always thin and fragile, as they are also at Achill (where it seems to be extinct now) and Rosapenna dunes. Can these be derived from old pockets collected when the dunes were covered with natural thickets, or when less broken into than they are now? Natural habitats for *Clausiliae* are a good distance away from some of these dunes, where they are found in numbers dead.

¹ *Op. cit.*, vol. I, 1892, p. 171.

THE GENUS *SCALA* (KLEIN) HUMPHREY, AS REPRESENTED
IN THE PERSIAN GULF, GULF OF OMAN,
AND NORTH ARABIAN SEA,
WITH DESCRIPTIONS OF NEW SPECIES.

By JAMES COSMO MELVILL, M.A., F.L.S., AND
ROBERT STANDEN (Assistant-Keeper, Manchester Museum).

(Read before the Society, June 10th, 1903).

SINCE the publication of our Catalogue of the Gastropoda of the Persian Gulf, Gulf of Oman, Mekran Coast, and that portion of the Arabian Sea north of Panjim and Goa,¹ as evidenced mainly by the collections made by Mr. Frederick W. Townsend, of the Indo-European Telegraph Service, we have received, and in part fully worked out, several additional consignments from him, these including some siftings of shell-sand and mud, dredged at a depth of from 140 to 160 fathoms, in two or three prolific localities in the Gulf of Oman, the results, as far at all events as concerns the Wentletraps, being embodied in this paper, and swelling the number of *Scala* reported from this region to nearly fifty species. Mostly minute, they are, in our opinion, adult in the vast majority of instances, and give another proof of the exceeding wealth of the abyssal molluscan fauna. Amongst the sixteen species now described we would especially mention *Scala amathusia*, *S. calidea*, *S. deifica*, *S. emiliae*, *S. laidlawi*, *S. rissoinaeformis*, *S. townsendi*, and *S. continens*, as possessing much beauty of form and sculpture, though all needing a lens of some power to demonstrate this.

Other families, such as the *Pleurotomidae*, possess an equal share of interesting and hitherto unrecorded forms; of these we shall shortly hope to publish an account.

Our best thanks are due to Mr. E. R. Sykes, Mr. W. Neville Sturt, Mr. G. B. Sowerby, and above all to Mr. Edgar Smith, of the British Museum, for aid and counsel.

* * * * *

For the use of the term *Scala* (Klein) Humphrey, 1797, in opposition to the till lately generally received and more familiar *Scalaria* Lam., we would refer to the lengthy and exhaustive comments of Prof. W. H. Dall,² of Washington, on the subject. He argues that by the strict law of priority *Cyclostoma* Lam., 1799, non 1801, nec 1804, should be used, but as this would be so confusing, and by this action the next prior name *Scalaria* Lam., 1801, would be rendered untenable, *Scala*, as first proposed, unbinomially, however, by Klein, in 1753, and then adopted by another unbinomial author, Humphrey, in the Catalogue of the "Museum Calonnianum," may, for the sake of

¹ *Proc. Zool. Soc.*, vol. ii. (1901), pp. 327-460, pl. xxi.-xxiv.

² *Bull. Mus. Comp. Zool.* (Harvard College), xviii., no. 29, part ii., pp. 299-307.

convenience, be used. This was also alluded to by one of us a few years ago, when we proposed to still consider *Scalaria* the best name to employ¹, while recognizing at the same time that it was against the strictest letter of the law of priority. We cannot augur what zoologists of the future will do; since using an unbinomial author's insufficiently diagnosed term, even if it be not exactly a *nomen nudum*, will not be considered always binding in the case of *Scala*. And, surely, it would be a terribly retrograde step to adopt *Cyclostoma*, albeit by many that name is now dismissed from the genus it has been so long connected with, in favour of *Pomatias* Studer. Perhaps, on the assumption "once a synonym, always a synonym," the difficulty may be bridged over, and *Scalaria* be again adopted. We, personally, hope this may be rendered possible.

FAMILY SCALIDÆ.

GENUS *SCALA* Klein, *SCALARIA* Lam.

Scala alata Sowb.

P.G. Galig Island, at low tide.

M.C. Charbar, 7 fathoms.

Scala angustata Dunker.

M.C. Charbar, 3-7 fathoms.

Scala bulbulus Sowb.

M.C. Charbar, 7 fathoms.

I. Karachi, at 3 to 7 fathoms, amongst loose rocks and sandy mud. This in our catalogue is called *S. clementina* Grat.

Scala amathusia sp.n. (Pl. VII., fig. 1).

S. testa fusiformi, mediocri, imperforata, candida, nitida, delicata. anfractibus 8-9, quorum apicales duo vel tres, pellucidi, perlæves, cæteris ad suturas impressis, ventricosulis, undique rectilamellatis, lamellis acutis, tenuibus, interstitiis levibus, numero ultimum ad anfractum 18-20, apertura rotunda, labro puillum crassiusculo.

Long., 6-50. *Lat.*, 2-50 mm.

Hab., Mekran Coast, Charbar, 7 fathoms.

One of the most delicately beautiful of the whole series, and therefore worthy to bear an appellation formerly assigned to Aphrodite. It is not uncommon, though evidently very local, nearly twenty specimens having been received from the above dredging. These differ very little between themselves, and are all very much of the same measurement.

Scala calidea sp.n. (Pl. VII., fig. 2).

S. testa attenuato-fusiformi, imperforata, delicata, albida, anfractibus circè undecim, quorum 2½ apicales, perlæves, albo-lactei, pelluentes, cæteris ventricosis, apud suturas profundè impressis, undique arcuè

¹ Melvill, "Principles of the Laws of Nomenclature," etc., *Journ. Conch.*, vol. viii., p. 475.

longitudinaliter lamellatis, lamellis crassiusculis, nitidis, albis, numero ultimum apud anfractum circa viginti, interstitiis lævibus, apertura rotunda, intus alba, labro continuo, lævi, incrassato.

Long., 14. *Lat.*, 5 mm., *sp. maj.*

Long., 7. *Lat.*, 3 mm., *sp. min.*

Hab., Persian Gulf, Maskat, 15 fathoms.

A most elegant *Scala*, with a somewhat familiar aspect, which, however, is not to be matched exactly. The spaces between the very numerous, but compact, lamellæ are quite smooth.

A few examples.

(κάδος, εἶδος, of beautiful form).

Scala cerdanta sp.n. (Pl. VII., fig. 3).

S. testa minuta, delicata, imperforata, oblongo-fusiformi, acuminata, alba, nitida, lævi, anfractibus novem, quorum quatuor apicales, attenuati, perlæves, albo-brunnei, hyalini, cæteris ad suturas impressis, ventricosulis, lævibus, undique tenuilamellatis, lamellis tenuibus, acutis, suprè hamatis, numero anfractum apud ultimum circa quatuordecim, apertura ovato-rotunda, labro crassiusculo, albo, nitido.

Long., 4. *Lat.*, 1.50 mm.

Hab., Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A minute species, of the normal type, very delicate, not very closely whorled, the lamellæ being bluntly hamate above.

It is almost impossible to define in a cut-and-dry description many of the minute differences between shells of such a uniform pattern as the *Scala*—the figures will best pourtray their various idiosyncracies.

(κέρδαντος, profitable).

Scala confusa Sw.

M.C. On the border-land towards India, 10 to 25 miles west of Karachi; also at Karachi and Manora Point.

Scala continens sp.n. (Pl. VII., fig. 12).

S. testa imperforata, ovata, tenui, albo-lactea, apice acuto, anfractibus 8, quorum tres apicales, lævissimi, vitrei, cæteris subventricosus, apud suturas excavatis, undique arcuè longitudinaliter lamellatis, lamellis concinnè continuis, regularibus, acutis, tenuibus, numero ultimum ad anfractum circa quatuordecim, interstitiis lævibus, apertura ovata, labro nitido, tenui, paullum reflexo.

Long., 4. *Lat.*, 2 mm.

Hab., Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., at 156 fathoms.

Also lat. 23° 55' N., long. 57° 48' E.

This, the most abundant of the many species of *Scala* dredged at the above soundings, bears a resemblance in the continuous lamellæ to *S. clathrus* L. It is a remarkably delicate and distinct form.

(*continens*, continuous).

***Scala deifica* sp.n.** (Pl. VII., fig. 4).

S. testa attenuato-fusiformi, gracili, angustè umbilicata, delicata, albo-lutea, anfractibus 9-10, quorum apicales 3-4, lævissimi, pervitrei, nitentes, cæteris ad suturas impressis, ventricosis, arcè longitudinaliter lamellatis, lamellis suprâ pulchrè aculeatis, regularibus, rectis, interstitiis spiraliter striolatis, numero anfractum apud ultimum circa septem-decim, apertura rotunda, labro continuo, incrassato, columellarem apud basim paullum reflexo.

Long., 11. *Lat.*, 4 mm.

Hab., Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms. India, Karachi, a small example.

If all the specimens we have sorted from the above two localities, large and small, belong to the same species, there must be considerable diversity of form, some being more ovate than others. The three large examples taken for the type, from the Gulf of Oman, are much alike, and all are similar in lamellæ and sculpture.

The lamellæ are not of the same character as those of *S. laidlawi*; they are deeper, and distinctly aculeate, but the interstices in both species are equally beautifully striolate.

(*deificus*, divinely formed).

***Scala eclecticica* sp.n.** (Pl. VII., fig. 5).

S. testa parva, umbilicata, ovata, albida, parum nitida, anfractibus sex, quorum duo subhyalini, albo-brunnei, perlæves, cæteris ventricosis, arctissimè lamellatis, lamellis lævibus, filosis, interstitiis lævibus, numero ultimum apud anfractum suprâ 40, apertura rotunda, labro continuo, subincrassato, nitido, albo.

Long., 5. *Lat.*, 3-50 mm., *sp. maj.*

Hab., India, Karachi.

A small species, with six whorls, of which three are tumid, beautifully longitudinally lamellate, the interstices being smooth; the last whorl, provided with about forty lamellæ, is very ventricose, the umbilicus is deep and well marked, outer lip thickened, white, shining.

(ἐκλεκτικός, selected).

***Scala emiliæ* sp.n.** (Pl. VII., fig. 6).

S. testa eximiè oblongo-fusiformi, angustè umbilicata, delicata, candida, anfractibus 8-9, quorum tres apicales perlæves, nitidissimi, hyalini, cæteris ventricosis, multum ad suturas impressis, undique arcè longitudinaliter lamellatis, lamellis obliquis, filosis, ultimum apud anfractum numero octo et viginti, interstitiis lævibus, nitidis, apertura rotunda, intus candida, labro tenui, apud basim paullulum incrassato.

Long., 12. *Lat.*, 5-50 mm.

Hab., India, Karachi, 3 fathoms.

In form a little like *S. (Amœa) martinii* Wood, but with quite

regular, shallow lamellæ, the interstices showing no spiral striation. Only one example occurred at the above locality. We have much satisfaction in dedicating this rare and very select species to Mrs. F. W. Townsend, wife of the discoverer.

Scala fasciata Sowb.

M.C. Charbar, 7 fathoms.

Scala glabrata Hinds.

P.G. Gais (or Kais) Island, 14 fathoms. Sheikh Shuaib Island, 15 fathoms. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

Scala goniophora sp.n. (Pl. VII., fig. 7).

S. testa eleganter fusiformi, delicata, albida, anfractibus octo, quorum tres apicales, subhyalini, cinereo-albescentes, ceteris multum apud suturas excavatulis, ventricosis, lævibus, undique longitudinaliter lamellatis, lamellis acutis, supra medium uncato-anguliferis, numero ultimum apud anfractum decem, apertura rotunda, labro continuo, extus incrassato.

Long., 5-15. Lat., 2 mm.

Hab., Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

Conspicuous for its lamellæ being angled just above the centre of each whorl; this species, of which we have seen three examples, seems in form a miniature of such a shell as *S. muricata* Risso from the Mediterranean. It is in reality hardly comparable with any other of the genus.

(γωνιόφορος, angled).

Scala hyalina Sowb.

P.G. Maskat, 15-30 fathoms.

In this beautiful species the whorls are partially evolute.

Scala irregularis Sowb.

M.C. Gwadûr, 2 fathoms, land mud.

Scala laidlawi sp.n. (Pl. VII., fig. 8).

S. testa attenuata, gracili, fusiformi, obtectè umbilicata, albida, delicata, anfractibus 11-12, quorum apicales duo vel tres cinerei vel straminei, hyalini, læves, ceteris ventricosis, apud suturas impressis, arcuè et bulchrè tenuilamellatis, lamellis obliquis, supra, apud suturas, uncinulatis, undique spiraliter arcuè liratis, ultimum apud anfractum numero lamellarum circa quatuor et viginti, apertura subrotunda, labro crassiusculo, continuo.

Long., 13. Lat., 4-50 mm.

Hab., Persian Gulf, Maskat, 6 to 15 fathoms.

A very elegant form, of most delicate texture, principally conspicuous for its thin oblique longitudinal lamellæ, uncinulate above, with spiral liræ, forming a beautiful network when viewed with a lens. The

sutures are closely impressed, the whorls being tumid. The nearest ally to this species would appear to be *S. pulcherrima* Sowb. The new form, however, being longer, with two more whorls, and possessing more gracefulness of contour. With this we are very pleased to be able to connect the name of our friend, Mr. Frank F. Laidlaw, whose zoological researches in Malayana during the "Skeat" Expedition have proved of much scientific importance.

***Scala laxata* Sowb.**

P.G. Gais (or Kais Island), 14 fathoms, amongst broken coral, much rarer than *S. glabrata*, which occurred in the same sounding with it. Also Sheikh Shuaib Island, 15 fathoms; Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

***Scala lineolata* Sowb.**

M.C. Fairly general.

I. Near Karachi, 5 fathoms, muddy sand.

***Scala maculosa* Ad. & Reeve.**

P.G. Gais (or Kais) Island, 14 fathoms, amongst broken coral.

***Scala melior* sp.n. (Pl. VII., fig. 9).**

S. testa gracili, oblongo-fusiformi, albida, imperforata, anfractibus octo, quorum tres apicales, parum nitidi, fusco-albescentes, cæteris apud suturas impressis, ventricosus, undique arcuè lamellatis, supernis numero lamellarum ultimum superantibus, videlicet, pro rata parte viginti ad septendecim, lamellis regularibus, pulchrè ad margines reflexis, rotundatis, interstitiis perlævis, apertura rotunda, labro ferè continuo, paulum incrassato.

Long., 6-50. *Lat.*, 2 mm.

Hab., India, Karachi.

Most nearly allied to *S. amathusia* M. & S., described at the present opportunity, but not quite so delicate a shell, the great peculiarity, which we have observed to the same extent in no other species of the genus, being that the fourth and fifth whorls exceed the last in the number of lamellæ. Several examples, all alike in every particular.

***Scala pallasii* Sowb.**

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

M.C. Charbar, 7 fathoms.

I. Karachi; all in somewhat juvenile condition, though unmistakable as to species.

***Scala pretiosa* Lam.**

P.G. No special locality given, at 26 fathoms, mud, rarely.

M.C. Fairly general, 3 to 7 fathoms, amongst loose rock and muddy sand. At Ormara, a fine dead specimen, measuring 43×25 mm.

I. Bombay, rare (A. Abercrombie).

***Scala replicata* Sowb.**

P.G. Lat. $26^{\circ} 50' N.$, long. $52^{\circ} 50' E.$, 29 fathoms, mud. Off Jask Point, 8 fathoms, mud.

Scala rissoinæformis sp.n. (Pl. VII., fig. 10).

S. testa ovato-fusiformi, sub-perforata, compacta, alba, anfractibus 8, quorum quatuor apicales, diaphani, læves, quatuor ultimis ventricosulis, apud suturas impressis, longitudinaliter undique arcuè lamellatis, lamellis continuis, nitidis, lævibus, hic illic, majoribus, incrassatis, numero ultimum ad anfractum circa octo et viginti, interstitiis, sub lente, arcuè spiraliter liratis, apertura rotunda, intus alba, labro rissoinæformi, incrassato, nitido, lævi.

Long., 4.2. *Lat.*, 2 mm.

Hab., Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A remarkable little species, of the same character as *S. nana* Jeffr., from European waters. In the incrassation of one or two of the lamellæ here and there, a resemblance to the much larger *S. varicosata* Lam., may be traced; that species, however, is of the sub-genus *Amæa*, while *S. rissoinæformis* belongs, we consider, to the typical section of the genus.

Almost twenty-five examples.

Scala sykesii sp.n. (Pl. VII., fig. 11).

S. testa delicata, ovato-fusiformi, alba, anfractibus septem vel octo, quorum quatuor apicales, attenuati, perlæves, vitrei, cæteris undique arcuè lamellatis, subventricosis, apud suturas compressis, lamellis tenuibus, acutis, obliquis, undulatis, numero ultimum apud anfractum circa 42, apertura circulari, labro haud incrassato, marginem ad columellarem reflexo.

Long., 4. *Lat.*, 2 mm.

Hab., Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This species seems distinct from *S. rissoinæformis* in many particulars, though at first one is apt to confuse the two. The form of the shell and apical whorls are, indeed, almost identical, but the lamellæ are of a different character, undulate, much closer and finer, and more oblique; there is no occasional unduly thickened varix, and the number of lamellæ on the last whorl exceeds forty. The outer-lip, also, is not so prominent, being barely thickened, while it is considerably reflexed over the columellar margin. The interstices between the lamellæ seem smooth. To Mr. Ernest R. Sykes we dedicate this species, which he was the first to extract from the shell-sand dredged at the above locality, where it occurred in considerable plenty, being, after *S. continens* M. & S. by far the commonest form.

Scala thelcteria sp.n. (Pl. VII., fig. 13).

S. testa minuta, ovato-fusiformi, imperforata, albida, crassiuscula, anfractibus octo, quorum quatuor apicales, læves, albo castanei, subhyalini, cæteris ventricosis, apud suturas impressis, undique longitudinaliter lamellatis, lamellis acutis, paullulum reflexis, fimbriolatis, numero ultimum apud anfractum quindecim, spiraliter conspicuè rudiliratis,

apertura ovato-rotunda, labro multum incrassato, ad basim obscure subquadrato.

Long., 3·75 to 4·15. *Lat.*, 2 to 2·5 mm.

Hab., Persian Gulf, Mussandam, 47 fathoms. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This is one of the most distinct of the smaller species now being differentiated. The lamellæ are, under a strong power, seen to be more or less fimbriolate, this being evidently caused by the spiral liræ showing so conspicuously at the points of junction. The outer-lip is very much thickened in proportion to the size of the shell, and towards the base is obscurely squarrose. Not infrequent.

(θελκτῆριος, charming).

***Scala townsendi* sp.n.** (Pl. VII., fig. 14).

S. testa fusiformi, delicata, alba, parum nitente, imperforata, anfractibus octo, quorum tres apicales, vitrei, læves, cæteris ad suturas impressis, tumidulis, undique longitudinaliter lamellatis, lamellis latis, suprâ uncatō-aculeatis, numero anfractum apud ultimum tredecim, interstitiis pulchrè spiraliter striolatis, apertura rotunda, labro continuo, crassiusculo.

Long., 5. *Lat.*, 2 mm.

Hab., Mekran Coast, Charbar, 20 fathoms.

Very delicate, pure milky white in colour, with the not crowded longitudinal lamellæ aculeate on the upper shoulder, just below the sutures. The whole surface is most beautifully spirally striolate, as in *S. thelcteria*, *S. deiffica*, and *S. laidlawi*.

***Scala (Clathrus) aculeata* Sowb.**

P.G. Koweit, 10 fathoms. Maskat, 15 fathoms.

M.C. Charbar, 7 fathoms.

I. Karachi, 3 fathoms, on muddy stones. Common at Bombay (Abercrombie, Townsend).

***Scala (Clathrus) clathrus* L.**

M.C. Charbar.

I. Karachi.

***Scala (Clathrus) gloriola* M. & S.**

P.G. Gulf of Oman. Maskat, 75 fathoms. Also lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A species of very elaborate sculpture.

***Scala (Clathrus) malcolmensis* Melv.**

P.G. Gulf of Oman: Malcolm Inlet (Kubbatt Ghazira), 24 fathoms.

I. Karachi Harbour.

A particularly interesting form, with winged, expanded lamellæ.

Scala (Clathrus) ovalis Sowb.

I. Bombay (Abercrombie). Only worn examples. Not yet found by Mr. Townsend.

Scala (Clathrus) philippinarum Sowb.

P.G. Gulf of Oman : Jask, dead examples, dredged at 7 fathoms.

Scala (Opalia) lamellosa Lam.

M.C. Charbar.

var. **pseudoscalaris** Brocchi.

M.C. Charbar.

I. Karachi, among algæ, low-tide mark.

Scala (Opalia) consors Crosse & Fischer.

I. Bombay (Abercrombie).

Probably a variety of *S. lamellosa* Lam.

Scala (Opalia) xenicima sp.n. (Pl. VII., fig. 17).

S. testa imperforata, fusiformi, acuminata, lævi, livido-fusca, paullum nitida, anfractibus 11-12, quorum apicales 2½ albescentes, hyalini, perleves, cæteris ventricosulis, longitudinaliter irregulariter lamellatis, lamellis filosis, attenuatissimis, tribus ultimis anfractibus sub lente, et præcipue apud medium, spiraliter striatis, in ultimo ipso à sutura usque ad peripheriam, majis conspicuis circâ basim una carina spirali forti et distincta succincto, apertura ferè rotunda, intus pallidè fusca, labro effuso, crassiusculo, margine columellari nitente, albo.

Long., 14. Lat., 5 mm. (sp. max.).

Hab., Mekran coast, Charbar, 5 fathoms, mud bottom; and Gulf of Oman, lat. 24° 58' N., long. 54° 56' E., 156 fathoms.

A large and two small examples, of which the former is taken as the type. The lamellæ, irregular, thin, and remarkably shallow, seem characteristic, and also the spiral striæ, partially covering the surface of the last three whorls. The spiral rib, at the base of the body whorl, is well defined and conspicuous. The colour is peculiar, of a livid-brown; surface fairly smooth and shining. *S. funiculata* Watson, from Pernambuco, is probably akin.

(ξένικος, strange).

Scala (Amæa) martinii Wood.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

I. Bombay (Abercrombie).

We accidentally omitted this in our first catalogue. Very well marked, beautiful specimens occur.

Scala (Amæa) raricostata Lam.

P.G. Gulf of Oman, Maskat, from 10 fathoms, coral sand. Small, but quite adult, examples.

Scala (Cirsotrema) corolla sp.n. (Pl. VII., fig. 18).

S. testa imperforata, ovata, percrassa, calcareo-alba, anfractibus sex, quorum apicalis minutus, huic proximus lævis, subhyalinus, cæteris

quatuor apud suturas impressis, gradatulis, undique longitudinaliter costatis, costis arctis, crassis, rudibus, hic illic varicosis, ultimi anfractus circa 16, versus basim spiraliter costulata, crassa, fimbriata, deinde pulcherrimè radiata, interstitiis profundis clathrato-fenestratis, apertura rotunda, peristomate multum incrassato, continuo, spiraliter striato, columellarem extus marginem minutè multi-clathrato

Long., 5. *Lat.*, 3 mm. (*sp. maj.*).

Hab., Gulf of Oman, lat. $24^{\circ} 58'$ N., long. $56^{\circ} 54'$ E., 156 fathoms, in shell sand.

This very interesting little species, with its chalky-white consistency and thickened ribs, peristome, and large occasional varices, has affinity with, being indeed, almost a replica in miniature of *S. (Opalia) diadema* Sowb., from the Galapagos Islands. However, it is impossible to dissociate it from the section *Cirsotrema*, the characters of the peristome and the basal rib being such as to preclude its being placed elsewhere. Two or three examples have occurred, alike, save as to size.

(*corolla*, dim. of corona).

Scala (Cirsotrema) hellenicum Forbes (= *crassilabrum* Sowb.).

P.G. Maskat, 10 fathoms.

M.C. Charbar.

Scala (Cirsotrema) fimbriolata Melv.

P.G. Gulf of Oman. Two off Maskat, 10 fathoms, thick mud. One of them, now in the British Museum, is 52 mm. longitudinally. The whorls are not nearly so ventricose as in *kieneri* Tapp.-Can. (*S. decussata* Kien.), and the lamellæ very wonderfully fringed. The finest *Scala* of this region. A few smaller examples occurred, in 1902, also off Maskat, at 15 fathoms.

I. Karachi, small, rarely.

Scala (Cirsotrema) hidryma Melv.

P.G. Gulf of Oman, lat. $24^{\circ} 58'$, long. $56^{\circ} 54'$ E., 156 fathoms.

M.C. Charbar. 3 to 7 fathoms.

I. Karachi, from whence came the type.

Scala (Cirsotrema) kieneri Tapp.-Can. (= *decussata* Kien).

I. Angrias Bank (Captain W. A. Tindall).

Scala (Cirsotrema) mammosa sp.n. (Pl. VII., fig. 15).

S. testa minutissima, subimperforata, alba, solidula, anfractibus octo, quorum quatuor attenuati, æquales, mamillati, albo-brunnei, læves, cæteris ad suturas multum impressis, ventricosis, longitudinaliter rudi-lamellatis, lamellis hic illic variciferis, apertura rotunda, labro continuo, multum incrassato, albo, sub lente striatulo.

Long., 3. *Lat.*, 1 mm.

Hab., Gulf of Oman, lat. $24^{\circ} 58'$ N., long. $56^{\circ} 54'$ E., 156 fathoms.

Very minute, but most characteristic, in sculpture and especially in the apical whorls, these being attenuate, equal, and narrowly

mamillate. The four lower whorls ventricose, roughly longitudinally lamellate, occasionally variciferous. The species seems, in form, a *Cirsotrema*, of the same alliance as, but much smaller than, *S. crassilabrum* Sowb. Frequent, but easily overlooked.

Scala (*Cirsotrema*) *optima* sp.n. (Pl. VII., fig. 16).

S. testa attenuato-fusiformi, albida, anfractibus (in specimine unico imperfecto) decem, quorum apicales? . . . cæteris ad suturas impressis, arcuissime et pulcherrime undique decussatis, lamellis longitudinalibus obliquis, tenuibus, acutis, creberrimis, hic illic variciferis, spiraliter liratis, interstitiis quadratis, apertura parva, rotunda, intus alba, labro tenui, marginem apud umbilicarem reflexo.

Long., 13. *Lat.*, 3 mm.

Hab., Maskat, 8-10 fathoms.

An imperfect type is all we have, but the characters seem most distinct. *S. kieneri* Tapp.-Can. (*S. decussata* Kien.) is the nearest ally, but in that species the lamellæ and the spiral liræ are infinitely coarser in texture. We should expect this species to grow considerably larger, but not to attain the length of three inches, as does *S. kieneri*.

Scala (*Acrilla*) *acuminata* Sowb.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

I. Karachi, 15 fathoms, very rarely.

Bombay (Abercrombie) not infrequent, mostly broken in shell-sand.

Scala (*Acrilla*) *minor* Sowb.

Scala (*Acrilla*) *gracilis* A. Ad.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

M.C. Charbar, 5 fathoms, mud. In colour of a darker brown than is typical, the lamellæ being more distant and fewer in number.

I. Karachi, 3 fathoms, amongst mud and stones.

Scala (*Constantia*) *intertexta* M. & S.

(*Ann. & Mag. N. Hist.* (7) vol. 2, p. 306, plate xxiv, f. 6, 1903).

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This very puzzling species seems best fitted to the sub-genus *Constantia*, but we are by no means certain as to its exact location, since in form of mouth and general build it, apparently, comes nearest to *Onoba egregia* A. Ad., which, however, may be an *Aclis*. The whole alliance requires much further study. Superficial likeness also exists to *Mumiola spirata* Ad. Two examples, so far, only have been found in the above dredging.

Scala (*Constantia*) *standeni* Melv.

I. Karachi. Also in lat. 18° 58' N., long. 71° 45' E., 40 fathoms.

An ovate brownish finely decussate species, which was found locally abundant at the above localities.

A few fragments also occurred in the dredging at 156 fathoms, of three hitherto unknown *Scala*. One of these, when full grown, must be a very fine species, intermediate between *Cirsotrema* and *Acrilla*, of the form of *A. acuminata* Sowb., but interstitially decussately-striolate. Another is near *S. thelcteria*, a third akin to *S. kieneri* Tapp.-Can. We can only hope to receive examples fit for description before long. Enough, however, has come to hand to shew how favoured are the Persian Gulf and Gulf of Oman as regards this very beautiful genus.

NOTE ON MACRON TROCHLEA.

By EDGAR A. SMITH, I.S.O.

(Read before the Society, September 9, 1903.)

IN the last number of this *Journal*, p. 326, Mr. J. Cosmo Melvill has given a list of the species belonging to the genus *Macron*. The first he refers to under the name of *M. kellettii* of A. Adams, overlooking the fact that this species had fourteen years previously been described by Gray as *Pollia trochlea*.

P. P. Carpenter referred to the latter, but was under the impression that it was a manuscript name.

The synonymy therefore will stand thus:—

Macron trochlea (Gray).

Pollia trochlea Gray, Zool. Beechey's Voyage, p. 111, (1839).

Pusio trochlea Gray, MS. in Brit. Mus.; P. P. Carpenter, Moll. Western North America, p. 140, Rep. Brit. Ass., 1863, p. 534.

Pseudoliva kellettii A. Adams, *Proc. Zool. Soc.*, 1853, p. 185.

No reference is made by Mr. Melvill respecting the relationship of *M. æthiops* (Reeve) to the present species and he does not seem to be aware that this subject has been discussed by R. E. C. Stearns.¹ The latter had a fine series of specimens given to him which demonstrated that "the grooving is an uncertain character." The number of specimens before him was "fortunately ample enough to settle all doubts and prove that the two forms should be united under one specific name." Mr. G. B. Sowerby who has very great experience in the variability of shells informs me that he is of the same opinion.

The type of *trochlea* in Gray's collection, now in the British Museum, is intermediate in respect of the spiral grooving between typical *æthiops* and *kellettii*, the types of which are also in the Museum.

LIST OF BRITISH NON-MARINE] MOLLUSCA.

BY B. B. WOODWARD, F.L.S., F.G.S., ETC.

(Read before the Society, January 14, 1903).

IN drawing up the accompanying list of British Non-Marine Mollusca, in accordance with the latest views of nomenclature, regard has been had in the first place to the "law of priority" where applicable. In such cases, however, where it is known that an earlier authority has mixed up two or more species under one specific name and no subsequent investigator has definitely selected one form and removed the others, but different authors have disputed over and muddled the nomenclature, the course pursued has been to select those earliest names concerning which there is no dispute, the object of nomenclature being to have a series of names for forms that will enable various workers to know exactly what form is meant by a given name.

This course is specially applicable to certain disputed forms in the Linnean collection. It must be borne in mind that the specimens in this celebrated collection were kept in open receptacles on which the name was written, while on some few examples the number of the species in the tenth edition of the "Systema" is written in ink. That in the hurried transference to this country, it was very easy for misplacements to occur, while Sir J. E. Smith is known to have added to it, and to have replaced specimens by what he considered finer examples; nor did its present custodians always exercise such wise care of it as they now take. So that the occurrence of a given form in a certain tray in that collection by no means implies that it is the rightful occupant.

As regards varietal names, those merely indicative of variations in colour, size, etc., are discarded (with few exceptions), the only names left being those of forms which, owing to anatomical differences or geographical distribution, have been or might be by some ranked as distinct species.

With respect to the general classification, it has appeared better for the present to adopt a modification of Fischer¹ than to follow the tentative grouping put forward by Pilsbry,² which last seems to require further investigation, full details not having as yet been published by him.

The slugs generally I have not personally investigated in detail, but the nomenclature here proposed seems the best from an arm-chair point of view. Mr. Collinge informs me he has a work in the press and shortly to be issued, which will give full details on the subject as known to him.

¹ Manuel de Conchyliologie.

² *Proc. Acad. Nat. Sci. Philadelphia*, 1900, pp. 563-4.

Proofs of this article have been circulated amongst such malacologists as are specially interested in the subject, and the writer has to thank the following friends and correspondents for much most valuable advice and assistance :—Dr. O. Boettger ; W. E. Collinge ; Prof. W. H. Dall ; G. Dollfus ; A. C. Johansen ; A. S. Kennard ; Dr. W. Kobelt ; Dr. H. A. Pilsbry ; E. A. Smith, I.S.O. ; E. R. Sykes ; W. A. Westerlund.

LIST OF SPECIES.

* Species introduced ; † Species no longer living in Britain but occurring in the post-pliocene deposits other than the Forest Bed Series.

GASTROPODA.

PULMONATA.

STYLOMMATOPHORA.

TESTACELLIDÆ Gray, 1833.

Testacella Cuvier, 1800.

maugei *Férussac*. 1haliotidea *Draparnaud*. 2scutulum *Sowerby*. 3

LIMACIDÆ Leach in Turton, 1831.

Limax Linné, 1758.

HEYNEMANNIA Malm, 1870.

maximus *Linné*. 4v. cinereo-niger *Wolf* [? = *hedleyi**Collinge*].

LEHMANNIA Heynemann, 1863.

flavus *Linné*. 5arborum *Bouchard-Chantereaueux* 6

Agriolimax Mörch, 1865.

agrestis (*Linné*). 7lævis (*Müller*). 8

Milax Gray, 1855.

sowerbyi (*Férussac*). 9v. carinata *Risso*.gagates (*Draparnaud*). 10

ZONITIDÆ.

Vitrina *Draparnaud*, 1801.pellucida (*Müller*). 11Vitrea *Fitzinger*, 1833.crystallina (*Müller*). 12

POLITA Held, 1837.

lucida (*Draparnaud*) [= *draparnaldi**Beck*]. 13cellaria (*Müller*). 14rogersi *B. B. Woodward* [= *glabra**Auctt.* & *helvetica Auctt.*]. 15alliaria (*Miller*). 16nitidula (*Draparnaud*). 17pura (*Alder*). 18radiatula (*Alder*). 19Zonitoides *Lehmann*, 1862.nitidus (*Müller*). 20excavatus (*Bean*). 21*minuscus *Binney*. 22Euconulus *Reinhardt*, 1883.fulvus (*Müller*). 23

ARIONIDÆ Gray, 1840.

Arion *Férussac*, 1819.ater (*Linné*). 24v. rufa (*Linné*).v. flagella (*Collinge*).v. lusitanica *Mabille*.v. bicolor [= *albolateralis Moquin-**Tandon*].subfuscus (*Draparnaud*). 25elongatus *Collinge*. 26intermedius *Normand* [= *minimus**Simroth*]. 27hortensis *Férussac*. 28v. celtica *Pollonera*.v. cottiana *Pollonera*.v. cærulea *Collinge*.fasciatus *Nilsson* [= *bourguignati**Mabille*]. 29v. circumscriptus *Johnston*.Geomalacus *Allman*, 1846.maculosus *Allman*. 30ENDODONTIDÆ *Pilsbry*, 1895.Punctum *Morse*, 1864.pygmæum (*Draparnaud*). 31Sphyradium (*Agassiz* MS.) *Char-**pentier*, 1837.edentulum (*Draparnaud*) [= *Ver-**tigo edentula*]. 32v. columella *G. v. Martens*.

| | | | |
|---|----|--|----|
| Pyramidula <i>Fitzinger</i> , 1833. | | <i>pomatia</i> <i>Linné</i> . | 58 |
| <i>rupestris</i> (<i>Draparnaud</i>). | 33 | <i>CERÆA</i> <i>Held</i> , 1837. | |
| GONYODISCUS <i>Fitzinger</i> , 1833. | | <i>memoralis</i> <i>Linné</i> . | 59 |
| <i>rotundata</i> (<i>Müller</i>). | 34 | <i>hortensis</i> <i>Müller</i> . | 60 |
| ‡ <i>rudrata</i> <i>Studer</i> . | 35 | EUPARYPHA <i>Hartmann</i> , 1843. | |
| | | <i>pisana</i> <i>Müller</i> . | 61 |
| HELICIDÆ. | | | |
| Eulota <i>Hartmann</i> , 1842. | | ENIDÆ (<i>n. n.</i>) | |
| ‡ <i>fruticum</i> <i>Müller</i> . | 36 | Ena <i>Leach in Turton</i> , 1831. | |
| Helicella <i>Férussac</i> , 1819 [= <i>Xerophil</i> <i>Held</i> , 1837]. | | <i>montana</i> (<i>Draparnaud</i>). | 62 |
| HELIOMANES <i>Moquin-Tandon</i> , | | <i>obscura</i> (<i>Müller</i>). | 63 |
| 1856. | | STENOGYRIDÆ. | |
| <i>virgata</i> (<i>Da Costa</i>). | 37 | Opeas <i>Albers</i> , 1850. | |
| HELICELLA [<i>s.s.</i>]. | | * <i>goodalli</i> (<i>Miller</i>). | 64 |
| <i>itala</i> (<i>Linné</i>) [= <i>ericetorum</i> <i>Müller</i>]. | 38 | * <i>clavulus</i> (<i>Fér.</i>) | 65 |
| CANDIDULA <i>Kobelt</i> , 1871. | | Subulina <i>Beck</i> , 1837. | |
| <i>caperata</i> (<i>Montagu</i>). | 39 | * <i>octona</i> (<i>Chemnitz</i>). | 66 |
| * <i>elegans</i> (<i>Gmelin</i>). | 40 | Cochlicopa (<i>Fér.</i>) <i>Risso</i> , 1826. | |
| COCHLICELLA (<i>Fér.</i>) <i>Risso</i> , 1826. | | <i>lubrica</i> (<i>Müller</i>). | 67 |
| <i>barbara</i> (<i>Linné</i>) [= <i>Helix acuta</i> | 41 | Azeca <i>Leach in Fleming</i> , 1828. | |
| <i>Müller</i>]. | | <i>tridens</i> (<i>Pulteney</i>). | 68 |
| THEBA <i>Risso</i> , 1826. | | Cæcilioides (<i>Férussac</i> MS. <i>em.</i>) | |
| <i>cantiana</i> (<i>Montagu</i>). | 42 | <i>Hermannsen</i> , 1846. | |
| <i>cartusiana</i> (<i>Müller</i>). | 43 | <i>acicula</i> (<i>Müller</i>). | 69 |
| Hygròmia <i>Risso</i> , 1826. | | VERTIGINIDÆ (<i>n. n.</i>) | |
| FRUTICICOLA <i>Held</i> , 1837. | | Jaminia <i>Risso</i> , 1826. | |
| <i>fusca</i> (<i>Montagu</i>). | 44 | <i>ABIDA</i> , <i>Leach in Turton</i> , 1831. | |
| <i>granulata</i> (<i>Alder</i>). | 45 | <i>secale</i> <i>Draparnaud</i> . | 70 |
| <i>hispidata</i> (<i>Linné</i>) [= <i>concinna</i> | 46 | LAURIA <i>Gray</i> , 1840. | |
| <i>Jeffreys</i>]. | | <i>anglica</i> (<i>Férussac</i>) [= <i>ringens</i> | 71 |
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| ‡ <i>montivaga</i> (<i>Westerlund</i>). | 48 | <i>cylindracea</i> (<i>Da Costa</i>) [= <i>umbili-</i> | 72 |
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| ‡ <i>umbrosa</i> (<i>Partsch</i>). | 50 | JAMINIA [<i>s.s.</i>]. | |
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| <i>aculeata</i> (<i>Müller</i>). | 51 | <i>Draparnaud</i>]. | |
| <i>lamellata</i> (<i>Jeffreys</i>). | 52 | Vertigo <i>Müller</i> , 1774. | |
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- Pomatias** *Studer*, 1789.
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EXPLANATORY NOTES.

Limax cinereo-niger.—Sufficient first-hand evidence has not yet been adduced to convince me of the specific distinctness of this form. Roebuck says *L. hedleyi* is a synonym; Collinge disputes this.

Limax marginatus Müll.—Those who claim Müller's name for the *L. arborum* Bouch.-Chant. on the ground that he states it is found on beech trees, entirely overlook his explicit statement that his species has "Carina dorsii alba, utrinque cinereo-subærulescens." Relying on this latter feature, Draparnaud, Jeffreys, and others have recog-

nized in it the form known as *Amalia sowerbyi* of Férussac; while it could be equally applicable to *Amalia gagates* judging by some figures. Since, therefore, it is not possible to say definitely what Müller did mean to describe, it is better to pass his name by and take that earliest one concerning which there is no question.

Milax, Gray,¹ has precedence by some months of Moquin-Tandon's *Amalia*, which appeared in the systematic portion of his classic work dated 1855 but issued 1856.²

Vitrea Fitz.—Mr. E. A. Smith in his presidential address³ shows clearly we have no choice but to accept this name.

As to "*V. glabra*", everyone knows that Jeffreys was misled as to its identification, nor can our species be identified with the *V. helvetica* Blum. Under the circumstances it appeared better to give this British form a name even if it were subsequently proved to be a synonym. Less mischief will be done to science (especially in the compilation of tables of geographical distribution) than by continuing to confound it with some other species to which it does not belong, hence in a separate paper I have called it *V. rogersi* in honour of its finder.⁴

V. hammonis Ström. has by some been identified as *V. radiatula*. I am unable to follow this, both the description and figure are far too vague and might fit one of many species of *Vitrea*. Mr. A. C. Johansen, of Copenhagen, and Professor Dall agree with me on this point.

Conulus being preoccupied both for Mollusca and Echinodermata, *Euconulus* which predates *Arnouldia* Bourg. must be accepted.

Arionidæ.—Only those forms are retained as varieties that having some anatomical difference have by some been reckoned species, and *A. ater* var. *bicolor* which is a striking var.; but one feels some compunction even about this.

Endodontidæ and *Helicidæ*.—Pilsbry's nomenclature⁵ is here followed as being the best and most reliable.

Helix virgata DaC.—Some have questioned whether DaCosta meant *H. pisana*, but a glance at his localities shows this to be impossible.

Helix itala Linn.—This being one of the few shells in the Linnean collection bearing in Linné's own hand the number referring to the 10th ed. of his "Systema" there can be no possible shadow of a doubt as to its identity. This has been confirmed on personal inspection by Mr. E. A. Smith, Mr. Newton, Mr. Kennard, myself and others.

Helix sericea Drap. disappeared from British lists because that species proved not to be a British form. *Hygromia granulata* Alder therefore stands.

1 "Cat. Pulmon.," pt. I., 1855.

2 *Proc. Malac. Soc.*, vol. 5, p. 261.

3 *J. Conch.*, vol. 6, p. 339.

4 *J. Conch.*, vol. 10, p. 309.

5 "Man. Conch.," ser. ii.

Vallonia pulchella and *V. costata*.—Dr. Sterki in distinguishing between these two forms as known to him, amongst other differences cites¹ "The presence of very fine, raised revolving lines on the nucleus or the $1\frac{1}{2}$ embryonal whorls [of *V. costata*], while those of *V. pulchella* are smooth." This feature alone is a very important one and could it be established would be quite sufficient to prove the distinctness of the two forms. A very careful examination under the microscope of an extended series drawn from various quarters, in my own collection, failed to yield a single specimen showing these nuclear striæ however strong the costæ might be, while the gradation between the costate and non-costate forms was traceable, and both forms are found side by side in some localities. Under these circumstances and from a consideration of the rest of Dr. Sterki's description and of his figures I conclude that there is a costate form of *Vallonia* in America distinct from the costate variety of *V. pulchella* present in Britain, and I recommend that, until it can be demonstrated more conclusively than has at present been done that there are two British species, the costate form be classed as a variety of the typical *V. pulchella*.

Helix aspersa.—The examples of this species in the Linnean collection occupy a tray labelled *H. grisea*. The figures referred to by Linné, however, and his locality, suggest a species near *H. pomatia*, and I agree with Hanley² that the determination is too uncertain and the name must be dropped. Possibly the present occupants of the tray are some of Sir J. E. Smith's additions.

Tachea having been proposed for a genus of Aves by Fleming in 1822 ("Phil. Zool.") it is necessary to adopt *Cepæa* of Held (*Isis*, 1837, col. 910).

Bulimina was Ehrenberg's spelling of the name for his new genus and since there is nothing wrong about it, it is hard to understand why or how it got converted into *Buliminus*. The name is pre-occupied, however, for Foraminifera³ and Leach's name *Ena* must be used with the corresponding family name Enidæ.

Pupa, if the laws of priority are to be followed, must unfortunately be given up. The name was first used in 1797 by Humphrey ("Mus. Calon.," p. 64) for a series of species, some from the West Indies, which cannot now be recognized. It was next employed by Bolten in 1798 ("Mus. Bolt.," p. 110) for *Voluta solidula* (now the type of *Solidula*) and *V. flammea* (now referred to *Acteon*). Lamarck, May or June, 1801 ("Syst. Anim. s. Vert.," p. 88) introduced the name for *P. uva* (which is a synonym for *Cerion uva* of Bolten) and in July, 1801, Draparnaud ("Tabl. Moll.," pp. 32 and 56, probably intending to

¹ *Proc. Acad. Philadelphia*, 1893, p. 261.

² "Ipsa Linn. Conch.," p. 378.

³ D'Orbigny, *Ann. Sci. Nat.*, vol. 7, 1826, p. 260.

follow Lamarck and put all the "chrysalis-shells" under *Pupa*) first employed the name in the sense in which it has ever since been used.

If *Pupa* has to go what name can be put in its place?

About 1813 (the exact date is at present not certain) Fleming wrote for Brewster's Edinburgh Encyclopædia¹ (vol. vii., pp. 55-107) the article "Conchology." In this article Fleming established the genus *Odostomia*,² he defines it (p. 76) as "Shell spiral, produced, mouth contracted, subangular, generally distinct from the body whorl and furnished with teeth," and states "the shells which we have formed into the present genus were included by Linnæus in the turretted division of his genus *Turbo*;" he proceeds to divide them into "A. Spires dextral" 1 *muscorum*, 2 *sexdentata*, 3 *tridens*, 4 *carychium*, 5 *juniperi*, 6 *interstincta*, 7 *unidentata*, 8 *plicata*, 9 *sandvicensis*, 10 *insculpta*; "B. Spires sinistral" 11 *perversa*, 12 *nigricans*, 13 *laminata*, 14 *biplicata*, 15 *labiata*, 16 *vertigo*;" and repeats this in a summary on p. 104. Fleming's next article on "Conchology" appeared in the "Supplement to the fourth, fifth and sixth editions of the Encyclopædia Britannica," vol. iii. (dated 1824, but issued pp. 1-316 in February, 1818, see vol. vi., p. 837, note) pp. 284-316. He seems then to have become aware of the work of continental authors, for while (p. 312) *Odostomia* is still retained as a sub-division of *Turbo*, he proceeds: "The *Turbo interstincta*, *unidentata*, *plicata*, *sandvicensis*, and *insculpta* of Montagu are of this genus. . . . The species which are related to the *T. bidens*, *perversus* and *muscorum* of Linnæus, constitute a very natural family which may be termed PUPACEA. . . . The dextral pupacea form two genera. The *Pupa* as originally constructed by Lamarck, was equally faulty with many of the old Linnæan genera, as we have restricted it to include dextral shells. . . . We can receive it into the *muscorum*, *sexdentatus* and *juniperi* of Montagu."

1 There is no evidence of more than one true edition of this work and that in 4to.; its publication was spread over from 1808 to 1830 when final title-pages for all the volumes were issued. Meantime as earlier volumes were exhausted further copies appear to have been struck off from the old plates (or issued from stock) having new temporary title-pages bearing the new date of issue and misalled, even by the publishers, "new edition." There has been the greatest difficulty in ascertaining, even approximately, the dates of publication of any of them, the wrappers and temporary title-pages having in all copies yet met with been religiously destroyed by the binders, after their manner.

2 Turton sought to emend this to *Odontostoma* (Carrington's "Teignmouth, Dawlish and Torquay Guide, pt. ii., Natural History of the district," by W. Turton and J. F. Kingston, 8vo., 1828? Sheet G, first page, at bottom.—A reprint of the conchological section appears to have fallen into the hands of Gwyn Jeffreys, who cites it ("Brit. Conch.," iv., 108) as "Enumeration of Marine Shells found on the Devonshire Coast," 1829). Jeffreys later sought to emend the name to *Odontostomia* ("List of Mar. Moll. at Oban, Ayrshire," *Malac. and Conch. Mag.* no. 2, [1839] p. 34) but repented of it and in the British Conchology reverts to Fleming's name which he explains as "per syncopen for *Odontostomia*." No valid objection need be taken to Fleming's name.

Kobelt ("Icon. Schalentrag. Europäisch. Meeresconch.," iii., p. 75), sets *Odostomia* aside for *Ptychostomon* of Locard (1886); but he was unaware of the dates of Fleming and mistaken as regards Say.

Fleming's next article was on "Mollusca" in vol. v. of the "Supplement," pp. 567-584 (dated 1824, but issued May, 1822, see vol. vi., p. 837, note): he now goes a step further and puts the *Pupacea* (p. 573) with "Snails, Tribe 2 [sect.] 2," leaving *Odostomia* with *Turbo* (p. 577).

The same arrangement occurs in his "Philosophy of Zoology," ii. (1822), pp. 458 and 488.

Fleming's final article was on "Mollusca" for vol. xiv. of Brewster's "Edinburgh Encyclopædia," the date of which must have been about 1825 to 1828. Here we find (p. 615): "II. *Bulimus*. . . . The species which are related to the *Turbo bidens*, *perversus* and *muscorum* of Linnæus constitute a very natural family," &c., exactly as in his article "Conchology" in the "Supplement," vol. viii.; while *Odostomia* is quoted under "Pectibranchia, First Fam. represented by genus *Turbo*," on p. 625.

It is obvious, therefore, that *Odostomia* was not primarily created solely for small land-shells with toothed apertures nor can Say be quoted in support of this contention. Say (Nicholson's Encyclopædia, Amer. ed., 1817) merely followed Fleming's nomenclature as the latest known to him when he referred the species *corticaria* to *Odostomia*, and this is made perfectly clear on referring to the third edition (1820) in which the name is altered to "*Pupa corticaria*."

Fleming having himself restricted his *Odostomia*, originally a mixed group, to certain marine forms, the name cannot now be revived for *Pupa*.

Of other names we have:—*Chondrus* Cuvier, "Règne Animal," ii. (1817), p. 408; unfortunately his first and therefore type species is the *Bulimus zebra* of Olivier, which invalidates the name for our purpose. *Cochlodonta* Férussac, "Table Syst. Limaçons," (1821), p. 62 57 is identical with the *Pupa* of Lamarck, and so fails to meet the case. We fall back, therefore, on *Jaminia*¹ of Risso, "Hist. Nat. Eur. Mérid.," iv. (1826) p. 88, established to receive *muscorum*, *marginata*, etc. This, of course, necessitates the alteration of the family name which, as suggested by Dr. Pilsbry, should be taken from the oldest genus of the group and be *Vertiginidae*.

Boettger's arrangement of the family is here followed in the main. He, however, makes all the subgenera of *Pupa* and *Isthmia* into genera but leaves the rest of *Vertigo* under that genus. This I do not consider necessary.

Torquilla was employed by Brisson in 1760 for a genus of birds, and the next available name is *Abida*, Leach in Turton.

¹ By an oversight, Risso cites this as "Leach MS." Leach's *Iaminia* was founded for *Ovatella* [= *Leuconia*] *bidentata*, but since he did not give any synonymy Risso evidently thought *Pupa bidentata* was meant.

Pupilla by the adoption of Risso's name for the genus becomes a synonym for *Jaminia* [s.s.].

Whether the species of *Vertigo* from Ireland just identified as *V. heldi* is really that species I am more than doubtful; it is, however, quite distinct from all the other British species.

Balea and *Clausilia* (all the species) are inextricably mixed up by DaCosta under his *Strombiformis perversus* which can consequently be disregarded. I consider that these two genera may with advantage be placed in a separate family Clausiliidæ.

Clausilia.—The arrangement followed is that of Boettger.¹

Clausilia rolpheii.—The full history of the name is:—

C. rolpheii Leach.—“Synopsis Moll. Gt. Brit.,” p. 119.

[Proofs only, privately circulated, 1820].

C. rolpheii Leach.—Férussac, *Journ. Phys.*, vol. 90 (April, 1820), p. 301. [nom. nud.].

C. (Iphigenia) rolpheii.—Gray, *Med. Repos.*, vol. 15 (1821), p. 239. [nom. nud.].

C. rolpheii Mihi.—Gray, *Ann. Phil.*, vol. 25 (1825), p. 413. [nom. nud.].

C. rolpheii Leach.—Turton's “Manual Shells Brit. Is.” (1831), p. 71, as a synonym of *C. plicatula* [which it is not].

C. rolpheii Leach.—Gray's ed. of Turton (1840), p. 215.

Succinea, variations endless.—There seem to be only three fairly satisfactory species, but this group sadly wants a competent biologist to take it up and investigate it from the anatomical standpoint.

Alexia was first proposed by Leach in his unpublished “Cat. Brit. Moll.,” and was not cited in literature till Gray used it in 1847; meantime Stephens in 1835 had applied it to a genus of Coleoptera. Unfortunately no other name is available, unless Gray's *Phytia*, used in 1821 by error for *Pythia*, be adopted; both Adams and Jeffreys quote it, apparently unaware that it was a Grayism.

Phytia myosotis (Drap.) 1801: *P. denticulata* (Mont.) 1803, wherefore the former must stand as the name of the species and the latter for the variety.

Leuconia is a synonym, as Gray himself admits in 1847, for *Ovatella* of Bivona.

Ancylus.—Linné recognised only one species—*lacustris*; but his description is applicable to both our forms and although the figures cited by Linné are rather indicative of the form we now know as *fluviatilis*, Müller as the first authority to separate the two was within his right, as we now understand it, in selecting which he choose to bear the original name and his determination need not therefore be departed from.

1 “Clausilien Studien.”

Acroloxus Beck,¹ for "*Ancylus lacustris* (L.) O. Müll." and other species has precedence over *Velletia* Gray, 1840.

Limnæa.—This name was used by Poli ("Test. Sicil." i., 1711, Introd. 31) as a generic term for the animals of certain Uniones, Mytili, etc. His habit, however, of giving one name to the animal and another to the shell containing it has led to the total disregard of his work as a serious contribution to zoological nomenclature.

Limnæa pereger (Müll.).—The *Helix limosa* of Linné is, as Hanley says, "too imperfectly defined for positive determination" and must be set aside. Müller was unaware that *pereger* is a substantive without an adjectival equivalent so that the specific name must remain in the nominative in apposition, like *Pecten lens*, *Ostrea frons*, &c. As for the variations in form, their name is legion but it is worthy of note that one *L. ampla*, of Hartmann, so closely resembles *L. auricularia* as frequently to be mistaken for it.

The *Helix balthica* Linn., was identified by Nilsson as a *Limnæa* which he found living in brackish water on the shores of the Baltic which is the same locality as given by Linné. Hanley considers that Nilsson's opinion is entitled to respect, but does not advocate its adoption. It is, however, by no means certain that Nilsson's conjecture is correct, there are several forms that would equally suit Linné's vague diagnosis, while the statement "rugis elevatis" is distinctly inapplicable to any *Limnæa* and nothing of the sort was observable on any *Limnæa balthica* in the collections in the Natural History Museum and no specimen is in the Linnean collection. Nilsson's *Limnæa balthica* has been identified as a form of *L. pereger* and since for reasons above stated it cannot be shown to be the same as Linné's the name if retained as a variety of *L. pereger* in the list must be attributed to Nilsson, NOT to Linné. Could the identity of Nilsson's form with Linné's be established *L. balthica* (Linn.) would have to replace *L. pereger* (Müll).

It seems pretty clear that *L. involuta* Harv. is a local race of *L. pereger* rather than of *Amphipeplea glutinosa*, and in this respect it stands on the same footing as *L. burnetti* Ald., so that the two should be treated alike, either as varieties of *L. pereger*, or allowed to rank as distinct forms. It has been the fashion to reckon the former as a species and the latter as a variety, but as pointed out by Mr. Lionel Adams² the young shell of *L. burnetti* has an involute spire while the embryonic shell of *L. involuta* has not. These embryonic characters are of great importance hence I would advocate the restoration of *L. burnetti* to specific rank.

Stagnicola, proposed originally by Leach, in his unpublished

1 "Ind. Moll.," 1837, p. 124.

2 *J. Conch.*, vol. 9, p. 299.

"Synopsis," was not quoted in literature till Turton's "Manual" appeared late in 1831 (Oct.); meantime the name had been proposed earlier in that year (July) by Brehm for a genus of Aves. Since, however, *Limnæa stagnalis* is the type of the genus no further sectional name is necessary.

Omphiscola Rafinesque (*Journ. Phys.*, vol. 88, 1819, p. 423) was defined by him as:—"Différent du *Lymnule* (*Lymnea* Auct.) par lèvre inférieure détachée de la columella, avec un ombilic oblong entre elles." This can only refer to the *L. pereger* and *L. auricularia* group (for which Montfort's *Radix* already stands), so that Beck's misapplication of the name to *L. glabra* cannot be accepted, and it is necessary to take Swainson's *Leptolimnæa*, founded for *L. glabra* in 1840.

Planorbis Guettard being pre-Linnean the name must be attributed to Geoffroy, the first post-Linnean writer to make use of it.

Coretus Adanson is also pre-Linnean, and not apparently adopted by any post-Linnean author before Gray in 1847.

Gyrorbis Fitzinger, 1833, is a synonym for *Valvata* and not as has been cited for *Tropidiscus*=*Planorbis* [*s.s.*] Ag.

Planorbis glaber Jeffr.—It has frequently been alleged of late years that this species is identical with *P. parvus* Say. As pointed out by me in 1890¹ this is not correct, and Prof. Dall, who obligingly examined the types, which are in the U.S. National Museum at Washington, and sent co-types over, now in the British Museum (Natural History), supported this view, writing "*Planorbis glaber* Jeffreys, in my opinion, is distinct from *P. parvus*. The latter is flatter and less deeply umbilicated, and shows much more of the whorls within the outer one. It is also distinctly less polished in the average specimen." In the original description, too, it is said to be "generally subcarinate on the margin." As a matter of fact both *P. parvus* and *P. glaber* would appear to be racial off-shoots from the boreal *P. arcticus* Beck, and must either be ranked as forms of one species, which in the apparent absence of linking forms seems undesirable,² or, as I think preferable, retain their distinctive nomenclature as suggested in the parallel case of *Limnæa pereger*, *L. burnetti* and *L. involuta*. The dates of foundation are:—

P. parvus Say, Nicholson's Encyc., Ed. 3 (1819), vol. 4 "Conchology," t.i.f., 5.

P. glaber Jeff., *Trans. Linn. Soc.*, 1830.

P. arcticus Beck, "Ind. Moll.," 1837.

¹ *Proc. Geol. Assoc.*, vol. 11, p. 381.

² Mr. Johansen writes that though formerly of this opinion he now, after inspecting a great number of examples, considers them one species.

Planorbis crista (Linn.).—This appears in the 10th edition of the "Systema" as *Nautilus crista* and was changed in the 12th edition by Linné to *Turbo nautilus*. The 10th edition being now agreed upon as the starting point the specific name of *crista* must stand.

Planorbis [*Helix*] *planorbis* (Linn.).—A reference to the figures cited by Linnæus shows that, as Hanley points out, two species *P. umbilicatus* and *P. carinatus* were included; consequently Müller's names must be accepted.

Planorbis [*Helix*] *complanatus* (Linn.) is as Hanley points out most applicable to the *P. nitidus* Müller as the "convexa, subtus plana" clearly shows. Both Müller and Jeffreys overlooked the fact that Linné's *Helix planorbis* contained Müller's *P. umbilicatus* and rashly identified his *Helix complanatus* with the latter's *P. umbilicatus*.

Planorbis nitidus Müll.—This may or may not be the same as Linné's *Helix complanatus* but it is identical with the *Helix lineatus* of Walker, as proved by the type specimens in the Copenhagen Museum.

Bulinus Adanson, 1757, is not only pre-Linnean, but was founded to include molluscs quite distinct from our British form and belonging moreover to the Planorbidae. Hence Fleming's *Aplexa* in its amended form of *Aplecta* must be accepted.

Hydrobia Hartmann, being preoccupied according to our notions by *Hydrobius* Leach, for Coleoptera, D'Orbigny's name *Paludestrina* should be taken: those, however, who follow the American school will probably adhere to *Hydrobia*. *Paludestrina* has already been adopted in the Society's "Marine List."

Hydrobia similis Drap. having, as pointed out by Frauenfeld,¹ a concentric operculum, whereas the form that has usually passed under the name has a spiral one, the two must be considered distinct. Frauenfeld, therefore,² proposed for the latter the name of *Amnicola confusa*. The selection of the genus, however, does not seem to accord, *Amnicola* being rather an American form, hence I follow Mr. Smith and place it in *Paludestrina* under Frauenfeld's specific name.

Pseudamnicola anatina is here included on Dr. Boettger's identification of specimens from Oulton that lacked both animal and operculum.

Bithynia.—This generic name Mr. C. Davies Sherborn points out to me was first established in Abel's "Narrative of a Journey into the Interior of China," 1818, p. 362, when it appears in its correct spelling, unspoil by Gray whose mangling of the word led Jeffreys into a false etymology.³

Viviparus having precedence over *Paludina*⁴ must stand but the

¹ *Verhandl. zool.-bot. Gesellsch. Wien*, vol. 12, p. 1151; vol. 13, p. 1029.

² *Op. cit.*, vol. 13, p. 1029.

³ Cf. paper by Rev. G. A. Frank Knight, *J. Conch.*, vol. 9, p. 273.

⁴ Cf. Smith, *J. Conch.*, vol. 6, p. 333.

emended form *Vivipara*, adopted by Dupuy and others, is preferable since parturition, alive or otherwise, is hardly a male function.

The correct nomenclature of the two British species of *Vivipara* continues to give anxiety to some. There is fortunately no need to disturb the commonly accepted names of to-day, any reversal between which would bring dire confusion, for the following reasons:—Linné's description of his *Helix vivipara* opens¹ with "*H. testa imperforata*," and this at once shows that of the two species which we now distinguish, but which would have been one for him, it certainly was not our *contecta* that most engaged his attention.

Müller was the first to distinguish between the two forms, but unfortunately in this as in several other instances (*e.g.* Linné's *Helix complanata*) he did not carefully follow Linné's description, he overlooked the "*imperforata*," and actually applied Linné's name to the umbilicated form, while quoting Linné's diagnosis, and started *fasciata* for the form corresponding to Linné's *vivipara*. Other conchologists, contented to accept and follow Müller's work without investigating its accuracy, caused a good deal of confusion in the literature.

Hanley finding nothing but examples of *V. contecta* in the Linnean collections assumes that this was Linné's *H. vivipara* and spends some ingenuity in endeavouring to explain away the word "*imperforata*." He appears to have entirely forgotten the comment in his preface (to the "*Ipsa Linn. Conch.*") that the collection was not in the condition in which it left Linné's hands. Not only did Sir J. E. Smith add to the collection but he appears to have substituted what he considered finer examples when he met with them. *V. contecta* generally attains a larger size and the explanation of its sole occurrence in the Linnean Cabinet is probably due to substitution on the part of Sir J. E. Smith who would have been unaware of any specific difference between the two forms.

Frauenfeld accepts the *Nerita fasciata* Müll., and apparently considers the *Helix vivipara* Linn. to be a synonym for the *Cyclostoma contectum* Millet (either ignoring Müller's *Nerita vivipara* or considering this a further exposition of Linné) and creates a new and entirely unnecessary name, *V. vera*, for the form. He, too, apparently never really grasped the Linnean diagnosis and overlooked the "*imperforata*."

All things considered therefore, and setting aside the by no means unimportant consideration of the further confusion that would result from a change of the now settled names, I am of opinion that *V. vivipara* (Linn.) should be accepted for the practically imperforate form and *V. contecta* (Millet) for the other, as Moquin-Tandon, Jeffreys, Reeve and others decided.

¹ "Syst. Nat.," 10th ed., p. 772.

Assiminea Leach in Fleming.—The Rev. G. A. F. Knight's explanation¹ of the origin of this name is so entirely satisfactory that I consider the name should be emended to *Assemanina*.² The differences in spelling quoted were obviously due to mistakes in reading Leach's uncertain handwriting with which Gray may not be entirely unconnected.

Cyclostoma having, as pointed out by Mr. R. B. Newton,³ been twice over used by Lamarck for marine shells before it was employed by Draparnaud for the *Nerita elegans* Müll., the name must be abandoned in favour of *Pomatias* Studer, 1789.

As regards the specific name for our sole British representative of the genus, Mr. Kennard and I have lately used *reflexus* (Linn.), following the evidence of Hanley that a specimen was the sole occupant of the tray so marked in the Linnæan collection. This, however, as we have seen in other cases is not good or reliable evidence and the name has only been employed doubtfully by Olivi and quoted in synonymy but not accepted by DaCosta and by Forbes and Hanley. Hence it seems wiser till, if ever, more direct evidence of what Linné really meant is produced to retain Müller's name, *elegans*, for the species.

Unio.—The author of this genus is Retzius, who wrote the thesis in which it is described, and not Philipppson who merely got his degree for defending in public that portion of the thesis, another student being equally nominally responsible for the next section. The rule in those days was for the Præses to write the thesis: on those rare occasions in which the student himself wrote it the fact was always noted either on the title or in the Præses' preface.

Anodonta cygnæa.—Isaac Lea himself, who made more species of Unionidæ than Locard and Drouet together, could only recognise one European species of *Anodonta*, and until someone can point out a genuine and fundamental anatomical difference between any of the innumerable "species" founded on mere shell variation it is perfectly absurd to recognise more than the one species.

Sphærium as a generic name, as well known, predates *Cyclas*. The latter was first used by Lamarck on plates of the "Encyclopédie Méthodique," 1798, for a miscellaneous collection of bivalves, but the following year, 1799 (*Mém. Soc. Hist. Nat. Paris*, p. 84) he again employs the name *Cyclas*, giving as sole type "*Tellina cornea* Lin." This, to our way of thinking, precludes the use suggested by Dall (*Proc. Biol. Soc. Washington*, xvi., p. 8) of the name *Cyclas* for *Venus islandica* of Linne on the authority of Link, 1807.

¹ *J. Conch.*, vol. 9, p. 275.

² *E.g.*—Just as *Dreissena* was emended to *Dreissensia* when the error was detected.

³ *Ann. and Mag., Nat. Hist.*, Ap., 1891, p. 345. The name *Hartmannia* proposed by Mr. Newton in lieu of the later *Pomatias* Hartmann, appears to be a synonym for *Cochlostoma* Jan.

Sphærium ovale Fér.—The British form that has long passed under this name is quite distinct from all the different forms that go by it on the continent, where the British form appears unknown, so that Gray's name of *S. pallidum* should be employed.

Pisidium Pfeiffer, 1821.—Dall (*Proc. Biol. Soc. Washington*, xvi., p. 7) makes this a section of the genus *Corneocyclas* (Fér. MS.) De Blainv. ("Dict. Sci. Nat.," xii., 1818, p. 278). Since, however, De Blainville admits that *Corneocyclas* is a synonym for *Cornea* Megerle (1811) which Dall rightly makes a synonym for *Sphærium*, while of the species cited the majority are referable to *Sphærium*, *Corneocyclas* must also be regarded as a synonym for *Sphærium*. Moreover, since De Blainville nowhere cites *Tellina pusilla* Müller under it and there is no proof that the *Cyclas fontinalis* Drap. which he does cite is the same species, it is hardly permissible to arbitrarily select *pusillum* as the type of *Corneocyclas* to-day and ignore the prior claim of *Pisidium*, already founded to include *inter alia* the *Cyclas fontinalis* of Drap.

The specific names here given are provisional. I am now engaged on the group which is readily separable by hinge characters, but owing to confusion in the literature the final nomenclature must wait till my investigations are a little further advanced.

The Land Shells of the Turton District.—The Urban District of Turton is situated about three miles north of the town of Bolton. I cannot find that this district has ever been worked by any conchologist, and after seeing the numerous species of mollusca found in Castleton, Derbyshire; Whalley, Chatburn, and other places in Lancashire, I came to the conclusion that this district is poor as regards this section of animal life. I have, however, spent much time during the past two years in collecting the land shells here with the following results:—I have not as yet taken any on the bleak moorland, but in the less elevated portions of the district I have found *Hyalina cellaria* fairly common at the foot of walls, and in gardens; *H. alliaria* underneath stones, common throughout the district; *H. pura*, one specimen only as yet discovered; *H. crystallina* in similar situations to *H. alliaria*, but not so common; *H. fulva*, found in two localities at rest on stones and broken bricks; *H. excavata*, only taken in one old lane, but seems to be fairly plentiful; *H. nitidula*, in several localities and fine specimens; *Helix rotundata* is the commonest land shell of the district, twenty and more specimens may sometimes be found on one stone; *H. rotundata* var. *alba* in one spot only; *H. rotundata* var. *rufula* in the same place, this variety is of a light buff colour, without the red-brown dashes of the type; *H. hispida*, this species is very local and seems confined to a little spot a few yards square; *Azeca tridens*, one specimen only; *Cochlicopa lubrica*, fairly common all over the district in suitable localities; *Carychium minimum*, found in one moist shady spot, underneath stones, and among the moss of the damp wall. During the last fortnight I have added to the above *Vitrina pellucida* taken on exposed cabbage leaves on November 5th, and several times since. The cabbage leaves had been laid out early in October and it occurred to me that possibly a certain stage of decay was necessary to render them attractive to this species.—J. W. BALDWIN (*Read before the Society*, December 10, 1902).

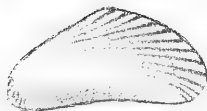
A NEW SPECIES OF MODIOLA FROM MALACCA.

By EDGAR A. SMITH, I.S.O.

(Read before the Society, September 9, 1903.)

THE species about to be described was obtained by Mr. Richard Evans in the Tale Nawi in Lower Siam. This semi-lake is probably brackish water, being almost enclosed from the sea, and having several rivers and streams running into it.

Modiola evansi, n. sp.



Testa parva, tenuis, antice angusta, lutescens, postice dilatata, viridis, lineis radiantibus saturatioribus picta, infra umbones sulcis circiter quatuor curvatis sculpta et striis paucis ab umbonibus ad marginem ventralem postice ornata, incrementi lineis tenuissimis sculpta; margo dorsi rectus, ventralis incurvatus; pagina interna bicolorata, supra nigro-purpurascens, infra albida, iridescens, ad marginum antice et portice crenulata, in medio lævis; umbones pallidi, haud terminales, fere contigui. Longit. 14 mm., alt. 7, diam. 4½.

This pretty species is distinguished by its small size, its form and colouration. The few sulci at the anterior end are coarser than those down the umbonal angle which reach the ventral margin rather behind the middle of it. The anterior end of the valves is denticulate at the margin, the denticles being very fine towards the umbo. The dark radiating lines on the posterior part of the shell are very slightly raised and thus produce a faintly crenulated margin which is most evident within the valves.

Dr. W. G. Ridewood has incidentally referred to this shell in his memoir on Lamellibranch gill-structure in the *Philosophical Transactions*, 1903, series B, vol. 195, p. 203.

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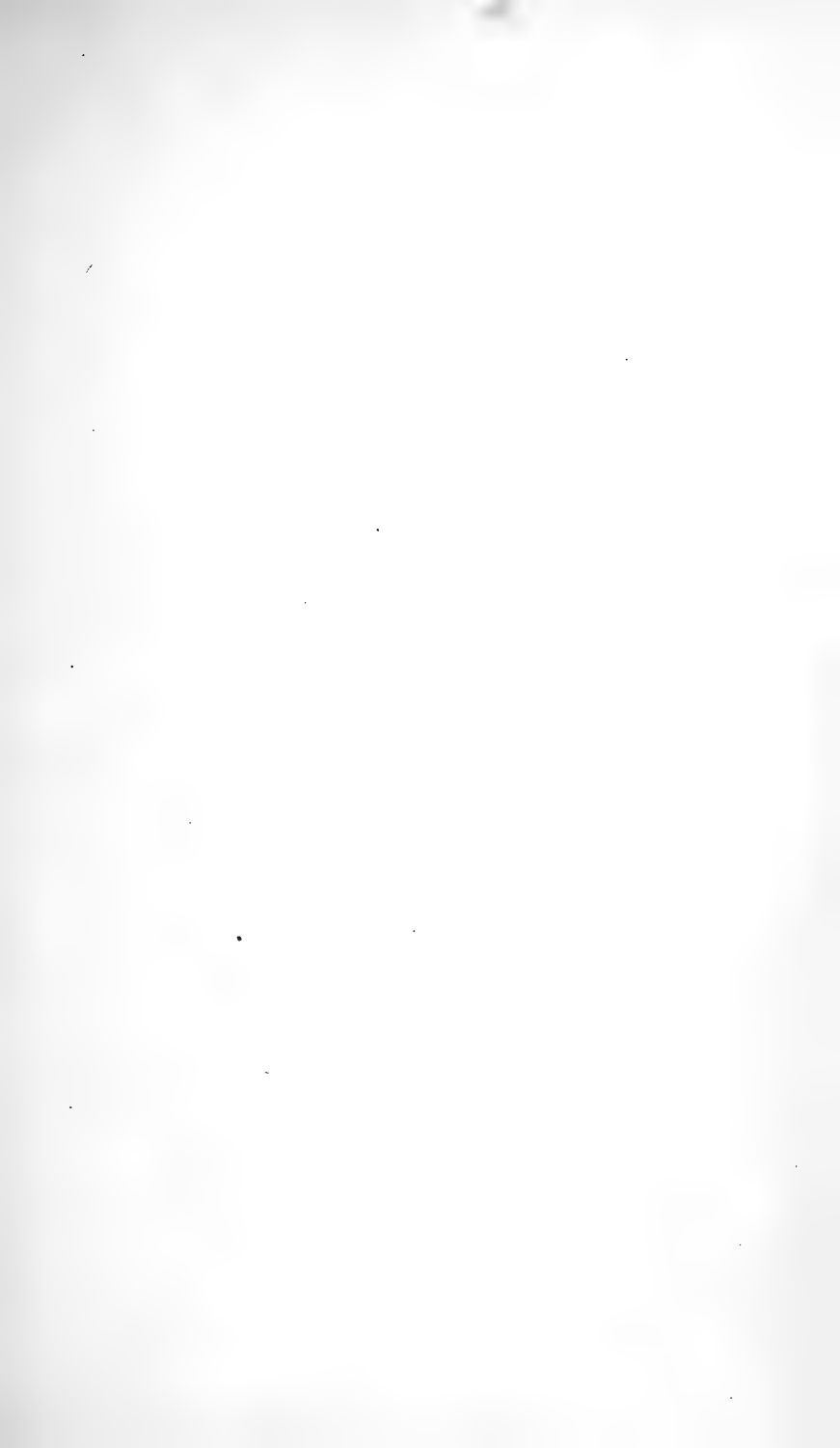
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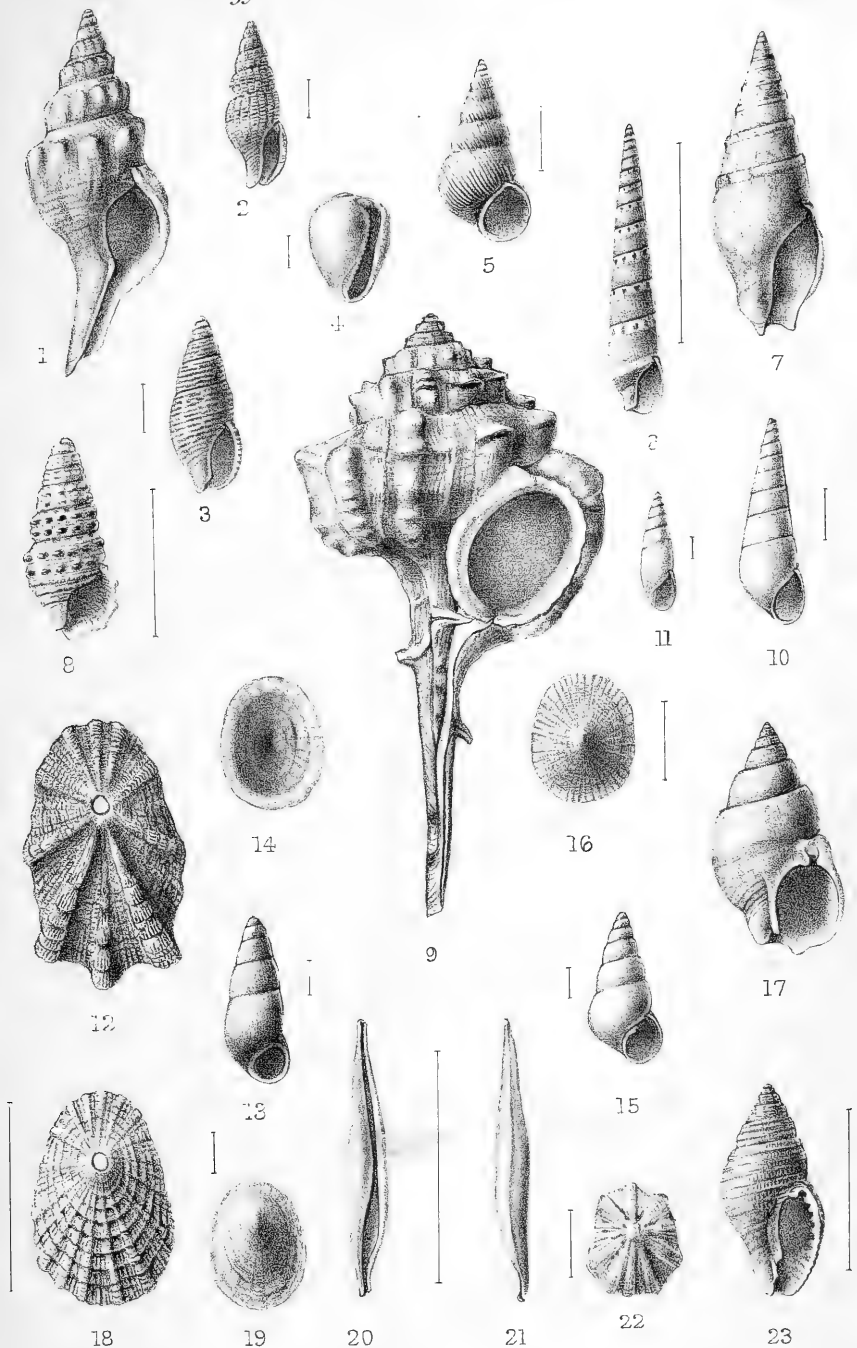


PLATE II.

SCALARIFORM EXAMPLES OF *HELIX NEMORALIS*,

PHOTOGRAPHED BY R. WELCH.

(See page 244).

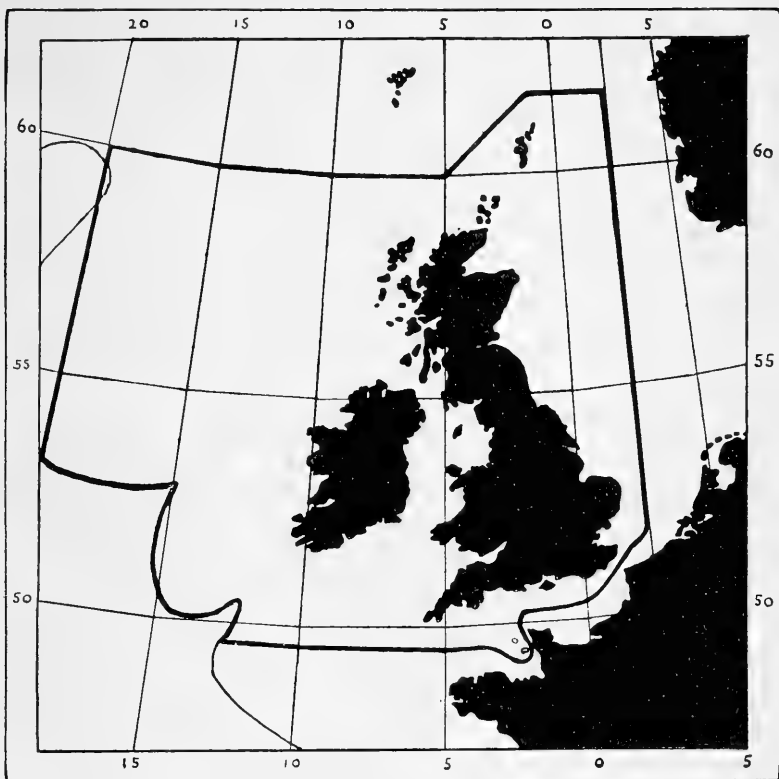
FIGS. 1-16.—A selected series from the Collections of Messrs. Brockton Tomlin, W. A. Green, W. Swanston, and R. Welch, showing graduation in the height of the spire.

FIGS. 17-19.—Examples showing results caused by injury to the shell.

FIG. 20.—Shell showing the deepest suture and roundest whorls of any observed; from the collection of Mr. Brockton Tomlin.



R. WELCH.



MAP OF THE BRITISH MARINE AREA.

The dark line shows the area taken into account in compiling the Society's List of British Marine Mollusca. It is bounded as follows :—

South—By latitude $49^{\circ} 30' N.$, which parallel passing eastwards terminates at longitude $5^{\circ} 0' W.$, or midway between the Land's End and Brest. Thence mid-channel is followed except for a detour to include the Channel Islands, until latitude $51^{\circ} 50' N.$ is reached off the east coast.

East—From latitude $51^{\circ} 50' N.$, longitude $2^{\circ} 30' E.$ is taken as the eastern boundary northwards.

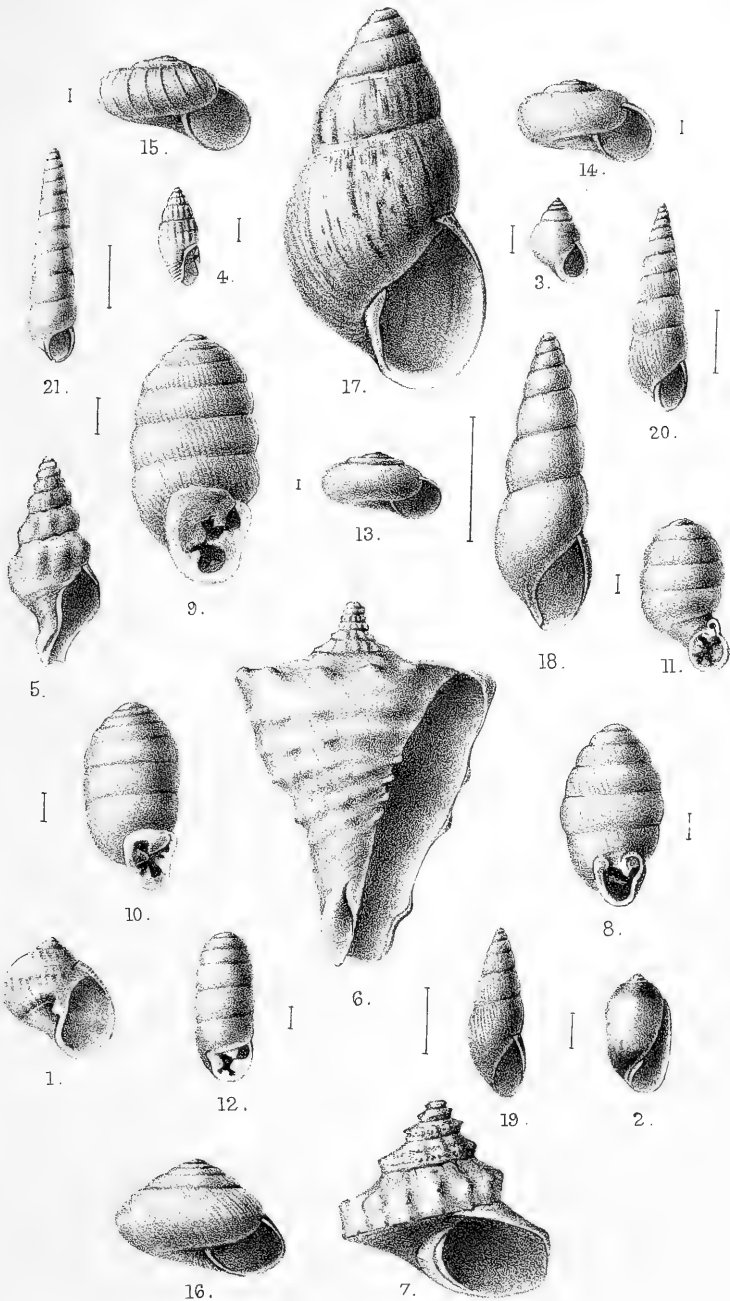
North—Latitude $60^{\circ} 0' N.$, coming from the west as far as longitude $5^{\circ} 0' W.$, thence due north-east to longitude $1^{\circ} 0' W.$, thence due east to meet the eastern boundary at $2^{\circ} 30' E.$

West—The contour line at the base of the continent at 1,500 fathoms, until this meets the meridian $20^{\circ} W.$ longitude, which is followed northwards to $60^{\circ} N.$ latitude, where it meets the northern boundary.



EXPLANATION OF PLATE IV.

| | | | | |
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| „ 21.— <i>Opeas venusta</i> | ... | ... | ... | „ 319 |



ENGLAND AND WALES.

| | |
|------------------|-------------------|
| Channel Isles | SOUTH WALES |
| PENINSULA | 41 Glamorgan |
| 1 Cornwall W. | 42 Brecon |
| 2 Cornwall E. | 43 Radnor |
| 3 Devon S. | 44 Carmarthen |
| 4 Devon N. | 45 Pembroke |
| 5 Somerset S. | 46 Cardigan |
| 6 Somerset N. | NORTH WALES |
| CHANNEL | 47 Montgomery |
| 7 Wilts N. | 48 Merioneth |
| 8 Wilts S. | 49 Carnarvon |
| 9 Dorset | 50 Denbigh |
| 10 Isle of Wight | 51 Flint |
| 11 Hants S. | 52 Anglesey |
| 12 Hants N. | TRENT |
| 13 Sussex W. | 53 Lincoln S. |
| 14 Sussex E. | 54 Lincoln N. |
| THAMES | 55 Leic. & Rutld. |
| 15 Kent E. | 56 Notts. |
| 16 Kent W. | 57 Derby |
| 17 Surrey | MERSEY |
| 18 Essex S. | 58 Cheshire |
| 19 Essex N. | 59 Lancashire S. |
| 20 Herts. | 60 LancashireMid |
| 21 Middlesex | HUMBER |
| 22 Berks. | 61 S.E. York |
| 23 Oxford | 62 N.E. York |
| 24 Bucks. | 63 S.W. York |
| ANGLIA | 64 Mid W. York |
| 25 Suffolk E. | 65 N.W. York |
| 26 Suffolk W. | TYNE |
| 27 Norfolk E. | 66 Durham |
| 28 Norfolk W. | 67 Northumb. S. |
| 29 Cambridge | 68 Cheviotland |
| 30 Bedford | LAKES |
| 31 Hunts. | 69 Westmorland |
| 32 Northampton | and L. Lancs. |
| SEVERN | 70 Cumberland |
| 33 Gloucester E. | 71 Isle of Man |
| 34 Gloucester W. | |
| 35 Monmouth | |
| 36 Hereford | |
| 37 Worcester | |
| 38 Warwick | |
| 39 Stafford | |
| 40 Salop | |

SCOTLAND.

| | |
|--------------------|-------------------|
| W. LOWLANDS | E. HIGHLANDS |
| 72 Dumfries | 93 Aberdeen N. |
| 73 Kirkcudbright | 94 Banff |
| 74 Wigtown | 95 Elgin |
| 75 Ayr | 96 Easterners |
| 76 Renfrew | W. HIGHLANDS |
| 77 Lanark | 97 Westerners |
| E. LOWLANDS | 98 Main Argyre |
| 78 Peebles | 99 Dumfries |
| 79 Selkirk | 100 Clyde Isles |
| 80 Roxburgh | 101 Cantire |
| 81 Berwick | 102 Ebudes S. |
| 82 Haddington | 103 Ebudes Mid |
| 83 Edinburgh | 104 Ebudes N. |
| 84 Linlithgow | N. HIGHLANDS |
| E. HIGHLANDS | 105 Ross W. |
| 85 Fife & Kinross | 106 Ross E. |
| 86 Stirling | 107 Sutherland E. |
| 87 Perth S. & Clkn | 108 Sutherland W. |
| 88 Mid Perth | 109 Caithness |
| 89 Perth N. | NORTH ISLES |
| 90 Forfar | 110 Hebrides |
| 91 Kincardine | 111 Orkneys |
| 92 Aberdeen S. | 112 Shetlands |

IRELAND.

| | |
|---------------|------------------|
| ULSTER | LEINSTER |
| 113 Derry | 122 Louth |
| 114 Antrim | 123 Meath |
| 115 Down | 124 Dublin |
| 116 Armagh | 125 Kildare |
| 117 Monaghan | 126 Wicklow |
| 118 Tyrone | 127 Wexford |
| 119 Donegal | 128 Carlow |
| 120 Fermanagh | 129 Kilkenny |
| 121 Cavan | 130 Queen's Co. |
| | 131 King's Co. |
| | 132 Westmeath |
| | 133 Longford |
| | CONNAUGHT |
| | 134 Roscommon |
| | 135 Leitrim |
| | 136 Sligo |
| | 137 Mayo E. |
| | 138 Mayo W. |
| | 139 Galway W. |
| | 140 Galway E. |
| | MUNSTER |
| | 141 Clare |
| | 142 Limerick |
| | 143 Tipperary N. |
| | 144 Tipperary S. |
| | 145 Waterford |
| | 146 Cork N. |
| | 147 Cork S. |
| | 148 Kerry |

MAP ILLUSTRATING THE

"CENSUS OF BRITISH LAND AND FRESHWATER MOLLUSCA."

EXPLANATION OF PLATE VI.

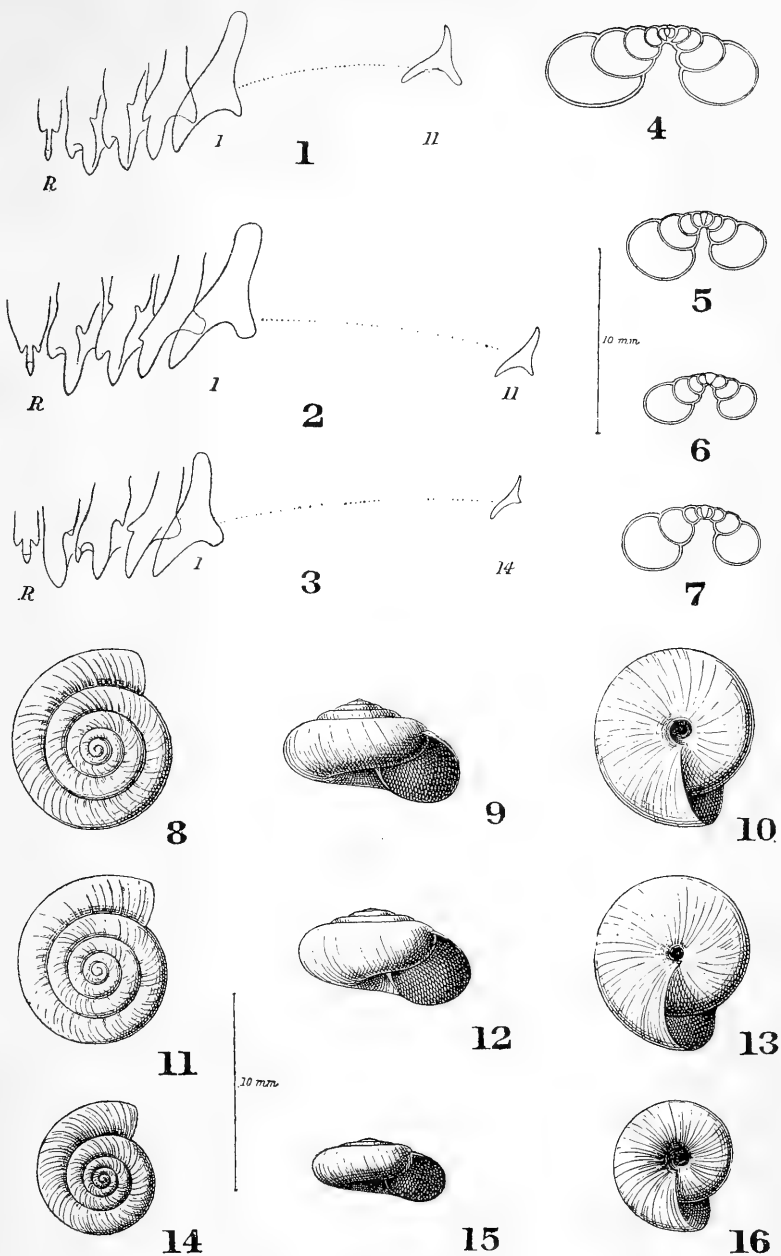
- FIG. 1.—Teeth of radula of *Vitrea alliaria* }
 „ 2.—Teeth of radula of *V. rogersi* } × 18
 „ 3.—Teeth of radula of *V. helvetica* }
 „ 4.—Median vertical section of shell of *Vitrea cellaria*.
 „ 5.—Median vertical section of *V. rogersi*.
 „ 6.—Median vertical section of *V. alliaria*.
 „ 7.—Median vertical section of *V. nitidula*.

These four sections (prepared for me by Mr. RILEY, the Lapidary in the Mineralogical Department of the Natural History Museum) shew the shape of the whorls in transverse section, their relative position in relation to the axis of the shell, the absence of real channelling at the suture, the appearance of which in *V. cellaria* and *V. rogersi* as contrasted with *V. alliaria* and *V. nitidula* is accounted for by the high angle at which each whorl meets its predecessor.

FIGS. 4-7 are all drawn to the same scale, which is shewn by the 10 mm. line placed close to them.

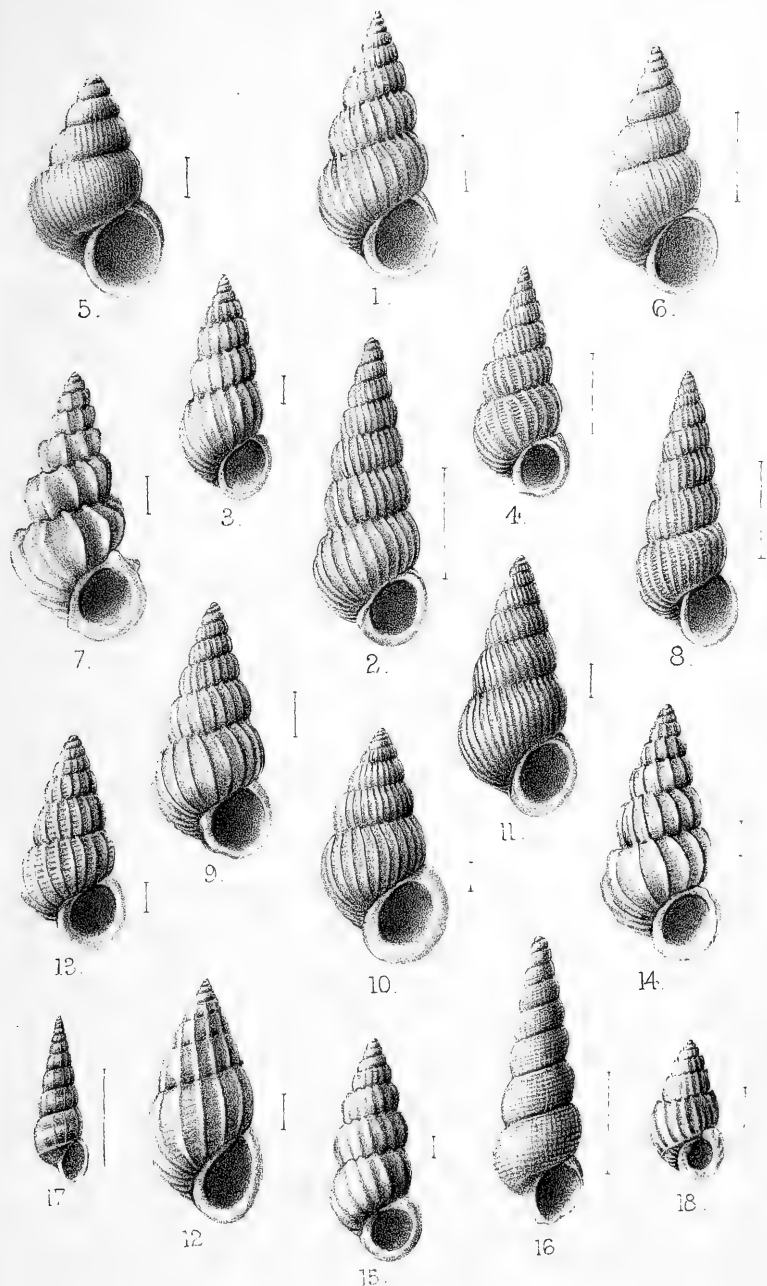
- „ 8-10.—*Vitrea helvetica*.
 „ 11-13.—*V. rogersi*.
 „ 14-16.—*V. alliaria*.

FIGS. 8-16 are all drawn to the same scale, which is indicated by the 10 mm. line between them.



EXPLANATION OF PLATE VII.

| | | | | |
|--|-----|-----|-----|----------|
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| „ 3.— <i>S. cerdanta</i> ... | ... | ... | ... | „ 342 |
| „ 4.— <i>S. deifica</i> ... | ... | ... | ... | „ 343 |
| „ 5.— <i>S. eclecticæ</i> ... | ... | ... | ... | „ 343 |
| „ 6.— <i>S. emiliæ</i> ... | ... | ... | ... | „ 343 |
| „ 7.— <i>S. goniophora</i> ... | ... | ... | ... | „ 344 |
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| „ 12.— <i>S. continens</i> ... | ... | ... | ... | „ 342 |
| „ 13.— <i>S. thelcteria</i> ... | ... | ... | ... | „ 346 |
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